TREASURE VALLEY HYDROLOGIC PROJECT

Geological and Geophysical Framework of the Treasure Valley

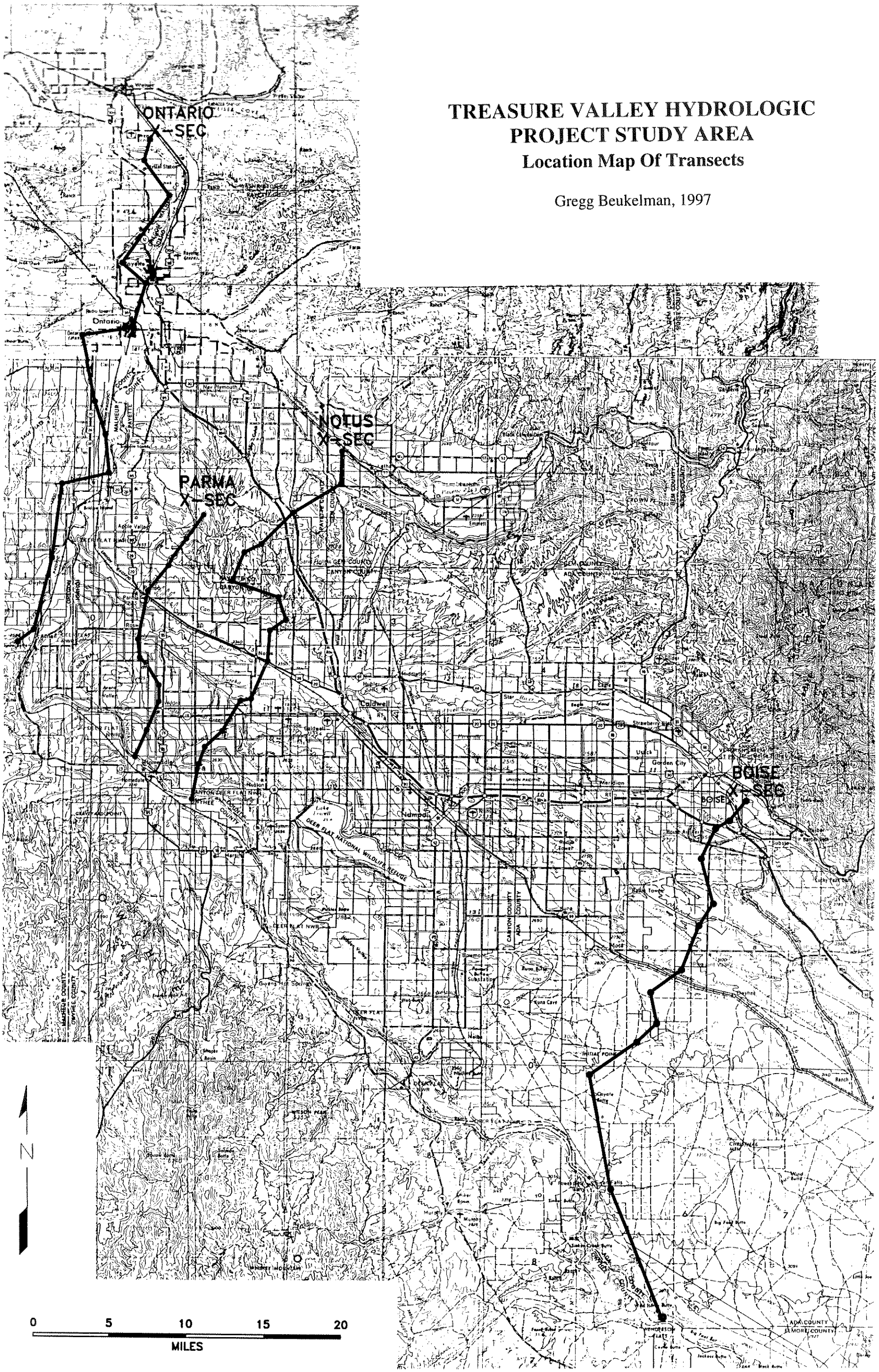
Reports on the Ontario, Parma, Notus and Boise Cross Sections

Gregg Beukelman, 1997

TREASURE VALLEY HYDROLOGIC PROJECT STUDY AREA

Location Map Of Transects

Gregg Beukelman, 1997



Cross section of the Treasure Valley in the Ontario area for the TVHP (Treasure Valley Hydrologic Project):
Notes on Geology of the Ontario area, Payette and Canyon Counties, Idaho and Malheur County, Oregon

by Gregg Beukelman
Department of Geosciences, Boise State University
Boise, Idaho 83725
tele: 208-385-1631, fax 385-4061, email: gbeukelm@trex.idbsu.edu

June 14, 1997

Introduction

The report and enclosed data are a preliminary compilation of information along a transect extending NNE-SSW from just south of the town of Weiser, southwest to the Adrian, Oregon area (Figs. 1a and 1b). The intent of this report is to show the nature of the Late Cenozoic stratified sediments in the upper portion of the western Snake River Plain near it's western extent (Figs. 2a, b, and c). Included for each well along the transect are the well owner, Land Office Grid coordinates, surface elevation (± 10 feet), and diagrams of well construction and lithology (attached). Lithologies, taken from well drillers' reports on record at the Idaho Department of Water Resources and the Boise office of the U. S. Geological Survey for the wells completed in Idaho and the Oregon Water Resources Department for those in Oregon, are plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers' reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area Fig. 1) is included showing the route of the transect (A-A'), individual well owners and surface geology taken from: Ferns and others, (1993), Othberg and Stanford (1992), Brooks, McIntyre, and Walker (1976), and Savage (1961).

Methods

The cross section included is a graphical presentation of subsurface lithologies based on water well drillers reports and deep exploration wells. Wells along the transect were selected to ensure maximum section coverage. Water well drillers reports were obtained from the Idaho Department of Water Resources for the wells in Idaho and from the Oregon Water Resources Department by means of their Internet-based Grid program for the wells in Oregon. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (see attached sheets) and the well completion data noted. Correlations were made at this scale and all data digitized and reduced to produce the cross section in figure 2. Accuracy of all elevations is probably ± 10 feet. No attempt has been made to correlate the upper contact of the lacustrine claystone because of very sparse data. However this contact occurs at about 1300-ft. elevation in the Rube Bolles #1 deep exploration well and about 1700-ft. elevation in the Kiesel Estates well based on a marked decrease in the electrical resistivity signature.

Structure

The structural nature of this area of the plain is inferred to be a normal fault-bounded graben. Faults are thought to be older structures owing to their lack of surface expression and the absence of offset in Pleistocene gravels and overlying Bonneville Flood deposits. Evidence of a major south facing fault near the southern end of the transect includes an approximate 120 ft. offset of the boundary between the overlying brown sediments and the blue sediments below. Additionally, two gravel units that occur at about 2100-ft. elevation in the Brown well are faulted against a monotonous clay in the City of Adrian well (fig. 2a). A small graben occurs in the vicinity of the confluence of the Snake River and the Payette River. This structure is evinced by an offset of the blue-brown sediment boundary (about 110 ft.). Another small graben (offset of less than 40 ft.) occurs near the north end of this transect (fig. 2c). None of these structures has been mapped on any existing surface geologic map and are here based almost exclusively on offset of the blue-brown sediment boundary. Although some of the recognized offset is likely the result of downwarping of sediments during diagenesis, the overall horizontal nature of the blue-brown boundary (0.03° between Malheur Experimental Station well and the American Fine Foods well) suggests that downwarping has been complicated by faulting.

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits and an interbedded basalt units. Basalt is not noted in any of the water wells and can be seen only in the Kiesel Estates well where the first occurrence is at -1600 ft. and in the Ore-Ida well where the first occurrence is at -2450 ft. and the basalt basement is at -6050 ft. (Minus signs indicate elevation below sea level). Surficial deposits include modern flood plain deposits, Bonneville Flood slackwater fine sediments, gravels of Pleistocene age, and older Tertiary age sediments. A typical stratigraphy in the upper potion of the section includes gravels overlain by up to 40 feet of sands and clays. Beneath the gravels is a complex sequence of interfingering gravels, sands, and clays that are interpreted to represent fluvial and shallow lacustrine deposits. This section contains an upper portion in which sediments are commonly some shade of brown, tan, or yellow and a deeper portion having sediments that are described as blue or grey in drillers logs. North of the fault that occurs near the southern extent of the transect, the boundary between these color-defined units is at 2230-ft ± 50 ft elevation except within the graben near the Snake River (1970-ft in the Mills well). The brown-colored unit is up to 130 feet thick beneath the uplands northeast the Snake River, but has apparently been mostly removed by erosion near the Snake River.

The nature of this brown-blue boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. Alternatively, it is also possible that recharge by oxygenated waters percolating through reduced (blue) iron minerals may oxidize formerly blue-gray colored deposits. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. In

the area of this transect and others completed across the western Snake River Plain, evidence such as the uniform elevation of the contact suggests that this brown-blue contact is the result of original diagenesis. Therefore, this oxidation/reduction contact may well be useful for geologic interpretation of depositional environments.

North of the major fault in the Adrian area, the deeper part of the sedimentary section is composed of over 4000 feet of monotonous lacustrine claystone. The upper contact of this section is at 1700-ft or 1400-ft elevations as interpreted from the electrical resistivity logs of the Kiesel Estates and Rube Bolles #1 deep exploration wells respectively. This upper contact of this unit is the top of the pro-delta mudstone facies interpreted by Wood (1997). The geometry of the upper contact of this claystone cannot be determined from this cross section as only the deep exploration wells penetrate it. Included within the claystone near its base are several interbedded basaltic flows and tuffs.

Hydrogeology

The static water level in wells along this transect vary only 100 feet in elevation. All of the wells along this transect are completed in the upper portion of the blue sediments and behave as confined of semiconfined. Discharge from wells ranges from 10-55 gpm in the southernmost four wells with a general increase in those to the north (90-500 gpm) with two exceptions. The Roberts Farm well was drilled to a depth of about 400 ft. and is dry and the Mills well adjacent to the Snake River drilled to about 520 ft. and producing 8-10 gpm.

References

Brooks, H.C., McIntyre, J.R., and Walker, G.W., 1976, Geology of the Oregon part of the Baker 1° by 2° quadrangle, State of Oregon, Department of Geology and Mineral Resources.

Ferns, M.L., and Brooks, H.C., 1993, Geologic map of the Vale 30X60 minute quadrangle, Malheur county, Oregon and Owyhee county, Idaho, State of Oregon, Department of Geology and Mineral Resources.

Idaho Department of Transportation, 1994, 30 X 60 minute series topographic maps of Boise and Weiser, Idaho, scale 1:100,000.

U. S. Geological Survey, 1993, 30X60 minute series topographic maps of Vale, Idaho-Oregon and Brogan, Idaho-Oregon, scale 1:100,000.

Idaho Department of Water Resources, 1997, microfiche file of drillers reports, Orchard Street Office.

Oregon Water Resources Department, 1997, Files of drillers reports via Internet Grid program.

Othberg, K.L., and Sanford, L.R., 1992, Geologic map of the Boise Valley and adjoining area, western Snake River Plain, Idaho: Idaho Geological Survey, Geologic Map Series, scale 1:100,000.

Savage, C.N., 1961, Geology and Mineral Resources of Gem and Payette counties, County report no. 4, State of Idaho, Idaho Bureau of Mines and Geology.

Wood, S.H., 1997, Structural contour map of the top of Miocene basalt basement rocks, western Snake River Plain, Idaho: Report for Idaho Department of Water Resources (2 sheets, 1:100,000).

Figures and enclosures

Figure 1a & b	Map (1:100,000) showing cross section transect, wells used in cross section, surficial geology, and location of deep exploration wells.
Figure 2a, b, and c	Cross section of geology and hydrogeology across the western Snake River Plain in the Ontario, Oregon area.
Figure 2d	Legend for cross section
Attached	Fifteen panels of wells used in cross section showing lithology, well construction, and completion data.
Attached	Drillers reports of selected wells.

FIGURE 1a

ONTARIO CROSS SECTION LOCATION MAP

Surficial geology from: (1) Ferns and others, (1993), (2) Othberg and Stanford (1992). (3) Brooks, McIntyre, and Walker (1976), and (4) Savage (1961). Existing geologic mapping is incomplete southeast of Ontario, Oregon.

ADOPTED MAP UNITS

Qa	Alluvium of Boise, Payette, and Snake Rivers (1,2,3)
Qfe	Fluviatile and eolian sediments (4)
Qsbf	Fluviatile sand, gravel, and silt (Holocene to upper Pleistocene)(1)
Qbfg	Gravel of Bonneville Flood-scoured Boise Terrace and Boise Floodplain (2)
Qwfg	Gravel of the Bonneville Flood- scoured Whitney Terrace (2)
Qas	Terrace gravels and alluvial-fan deposits (Holocene? And Pleistocene) (1)
Qcn	Caldwell-Nampa sediments (4)
Qwig	Sandy silt of the Bonneville Flood slack water (2)
Qwgs	Sandy silt of Bonneville Flood slack water (2)
Tst	Tuffaceous sedimentary rocks (3)

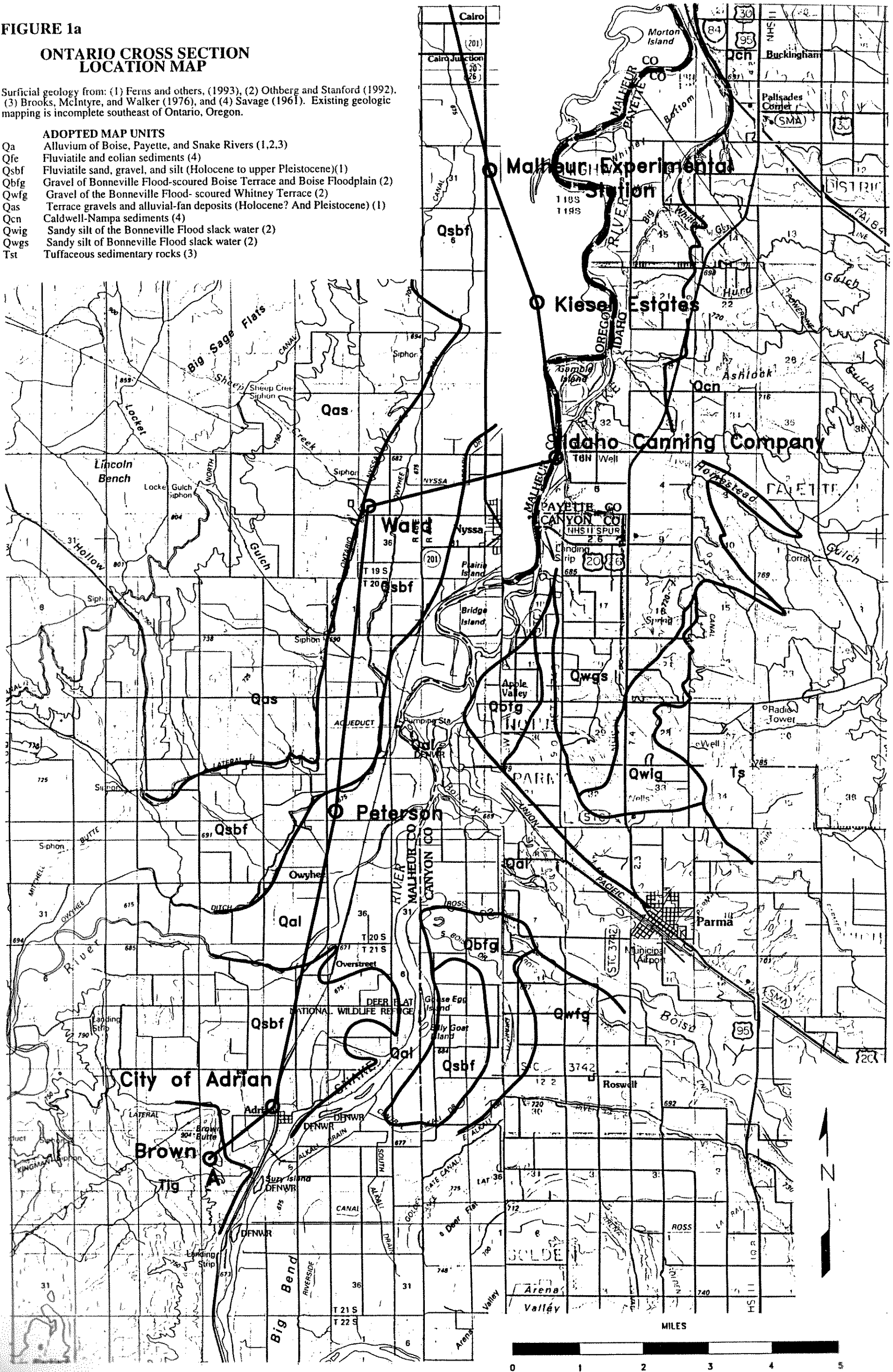


FIGURE 1b

ONTARIO CROSS SECTION LOCATION MAP

Surficial geology from: (1) Ferns and others, (1993), (2) Othberg and Stanford (1992), (3) Brooks, McIntyre, and Walker (1976), and (4) Savage (1961). Existing geologic mapping is incomplete southeast of Ontario, Oregon.

ADOPTED MAP UNITS

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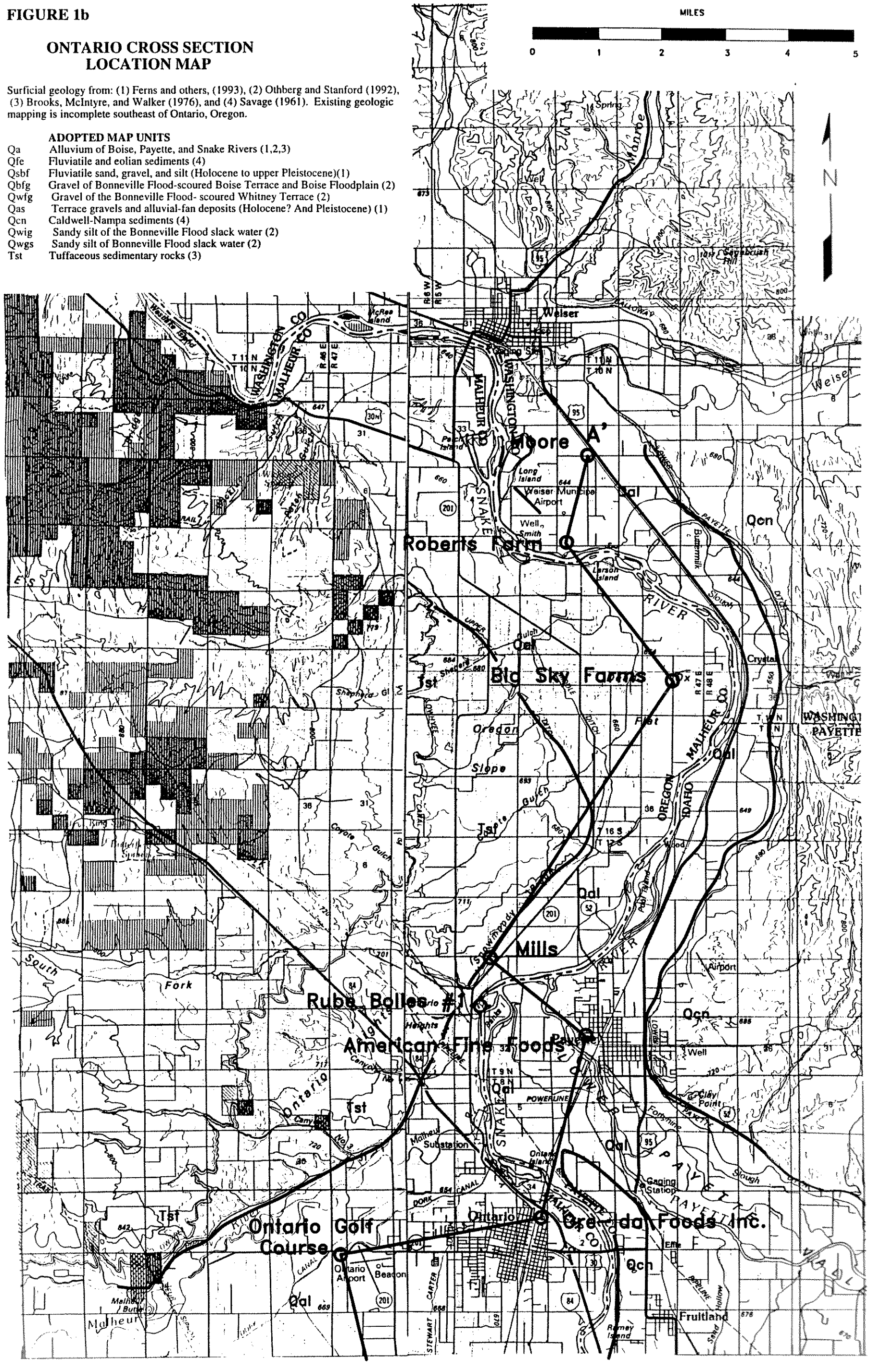
Qbfg	Gravel of Bonneville Flood-scoured Boise Terrace and Boise Floodplain (2)
Qwfg	Gravel of the Bonneville Flood- scoured Whitney Terrace (2)
Qas	Terrace gravels and alluvial-fan deposits (Holocene? And Pleistocene) (1)
Qcn	Caldwell-Nampa sediments (4)
Qwig	Sandy silt of the Bonneville Flood slack water (2)
Qwgs	Sandy silt of Bonneville Flood slack water (2)
Tst	Tuffaceous sedimentary rocks (3)



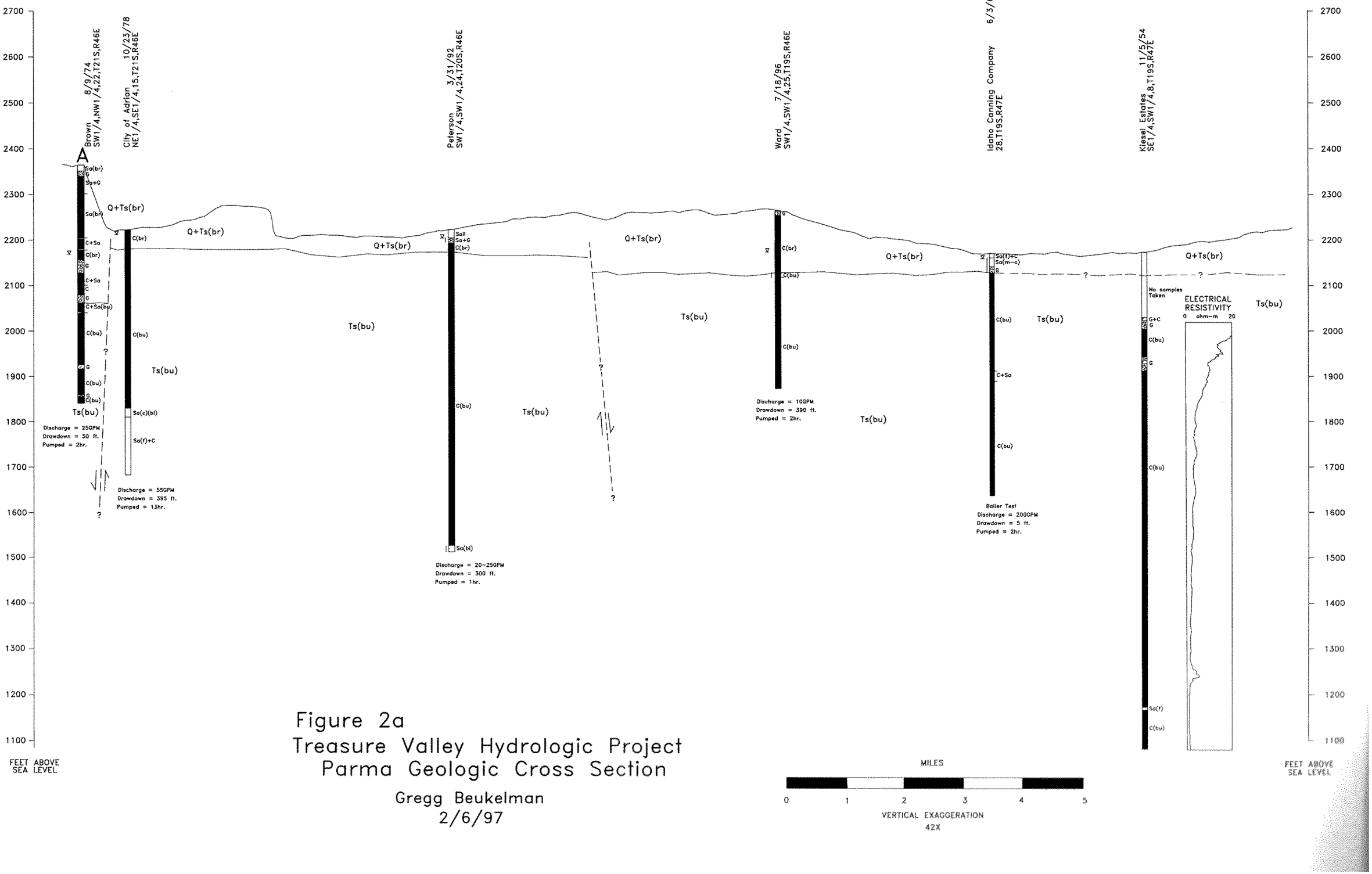


Figure 2a
Treasure Valley Hydrologic Project
Parma Geologic Cross Section

Gregg Beukelman
2/6/97

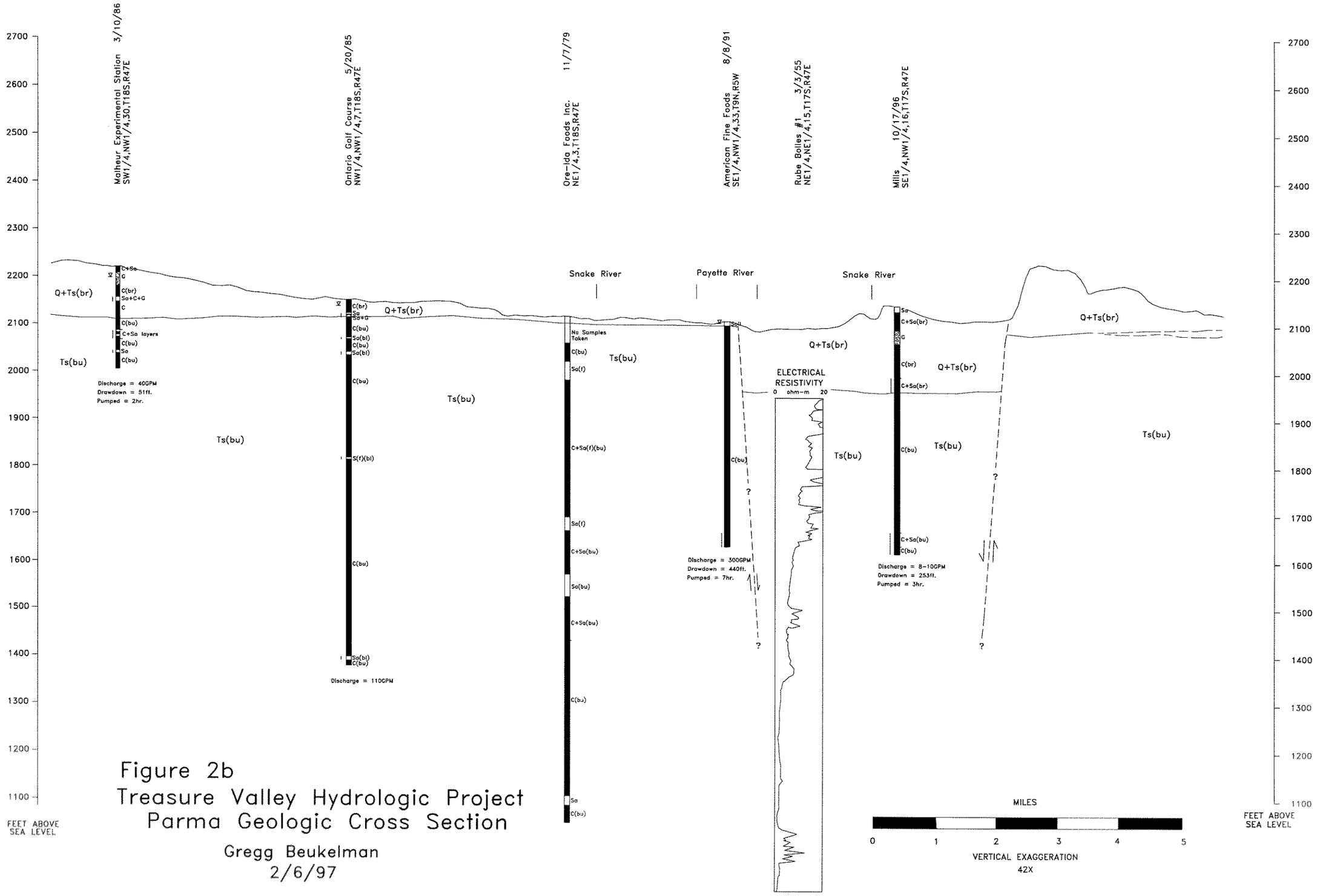


Figure 2b
Treasure Valley Hydrologic Project
Parma Geologic Cross Section

Gregg Beukelman
2/6/97

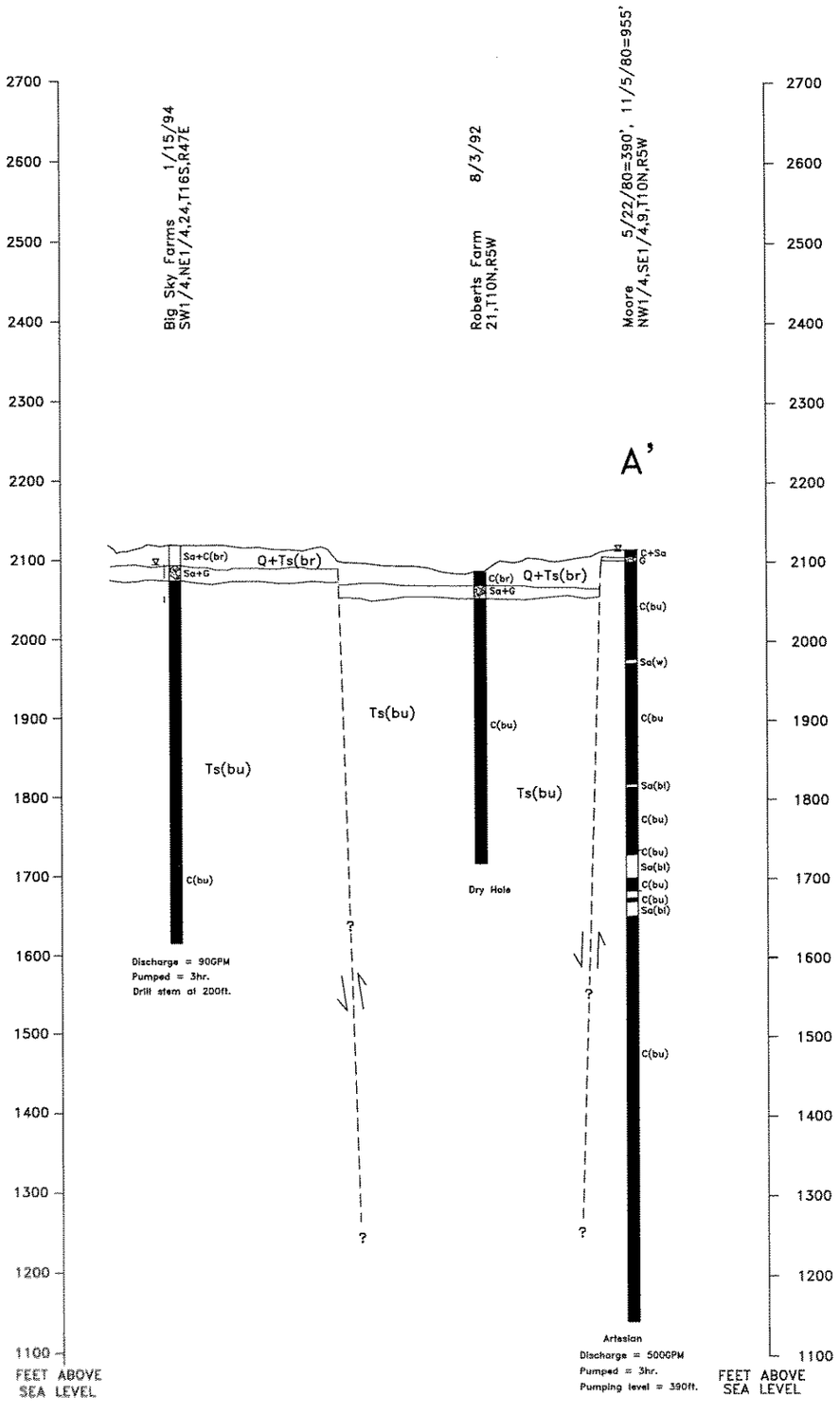


Figure 2c
Treasure Valley Hydrologic Project
Parma Geologic Cross Section

Gregg Beukelman
2/6/97

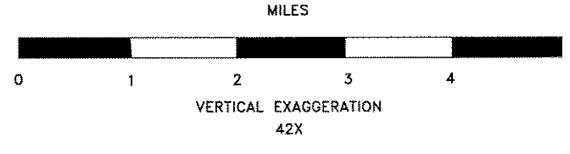
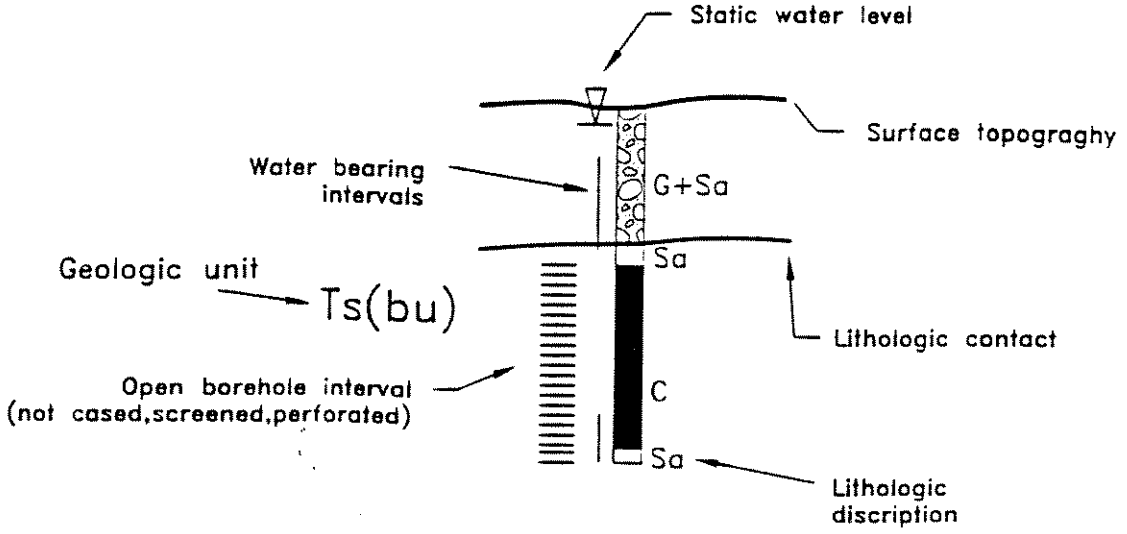


FIGURE 2d

CROSS SECTION LEGEND

Diagram of Typical Well Interval



GEOLOGIC Units (After: (1) Ferns and others, (1993), (2) Othberg and Stanford (1992), (3) Brooks, McIntyre, and Walker (1976), and (4) Savage (1961).

Qa	Alluvium of Boise, Payette, and Snake Rivers (1,2,3)
Qfe	Fluviatile and eolian sediments (4)
Qsbf	Fluviatile sand, gravel, and silt (Holocene to upper Pleistocene)(1)
Qbfg	Gravel of Bonneville Flood-scoured Boise Terrace and Boise Floodplain (2)
Qwfg	Gravel of the Bonneville Flood- scoured Whitney Terrace (2)
Qas	Terrace gravels and alluvial-fan deposits (Holocene? And Pleistocene) (1)
Qcn	Caldwell-Nampa sediments (4)
Qwig	Sandy silt of the Bonneville Flood slack water (2)
Qwgs	Sandy silt of Bonneville Flood slack water (2)
Tst	Tuffaceous sedimentary rocks (3)

WELL LITHOLOGIC ABBREVIATIONS

G	Gravel
Sa(c,m,f)	Sand (coarse, medium, fine)
C	Clay

When two sediment sizes are combined (C+Sa) the first sediment is the most abundant.

Color modifiers: Brown (Br), White (W), and Blue (Bu) are included for Tertiary sediments.

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Ray Moore
2000 North 22nd Ave
Address Pasco, Washington 99301

Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☒ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other looking for hot water (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
250 inches	6 inches +	1 feet	32 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

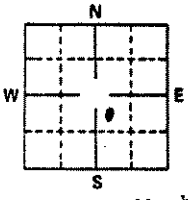
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from ____ feet to ____ feet
Surface seal depth 20 Material used in seal: ☐ Cement grout ☒ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Washington
NW ¼ SE ¼ Sec. 9, T. 10N N/S, R. 5W E/W.

7. WATER LEVEL

Static water level 0 feet below land surface.
Flowing? ☒ Yes ☐ No G.P.M. flow _____
Artesian closed-in pressure 1 p.s.i.
Controlled by: ☐ Valve ☒ Cap ☐ Plug
Temperature 68°F. Quality good

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
500	390	1

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
12	0	3	top soil		
12	3	12	sandy clay		
12	12	15	sand		
12	15	27	gravel		
6	27	160	blue clay		
6	160	161	white sand	x	
6	161	307	blue clay		
6	307	308	black sand	x	
6	308	390	blue clay		
6	390	400	black sand	x	
			put in tempory bentonite seal he wants to case and go deeper		

RECEIVED
JUN 17 1980
Department of Water Resources
Western Regional Office

10. Work started 5/20/80 finished 5/22/80

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name DALLAS DRILLING Firm No. 224
Address Payette, Idaho Date 5/28/80
Signed by (Firm Official) Dallas T. Doff
and
(Operator) Johnny T. Doff

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Ray Moore
2000 N 22nd Ave.
Address Pasco, Washington 99301

Owner's Permit No. _____

2. NATURE OF WORK

☐ New well ☒ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☒ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness		Diameter		From		To	
.250	inches	6	inches +	1	feet	669	feet
.258	inches	8	inches	1	feet	40	feet
	inches		inches		feet		feet
	inches		inches		feet		feet

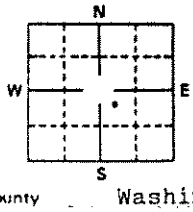
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number		From		To	
	perforations		feet		feet
	perforations		feet		feet
	perforations		feet		feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 40 Material used in seal: ☒ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. ___ Block No. ___
County Washington
NW ¼ SE ¼ Sec. 9, T. 10N N/S, R. 5W E/W.

7. WATER LEVEL

Static water level 0 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow ___
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 80 °F. Quality good with gas

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
10	950	2

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
			In addition to Ray Moore		
6	395	400	blue clay		
6	400	405	sand stone		
6	405	430	black/white heaving sand	x	
6	430	445	blue clay		
6	445	451	black sand flowing heaving		
6	451	454	blue clay		
6	454	478	black sand heaving		
6	478	578	blue sticky clay		
6	578	579	black sand		
6	579	633	hard blue shale casing		
6	633	955	blue shale hard		

RECEIVED
DEC 19 1980
Department of Water Resources
Western Regional Office

DEC 24 1980

Water Resources

10.

Work started 10/17/80 finished 11/5/80

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name DALLAS DRILLING Firm No. 224
Address Payette, Idaho Date 12/15/80
Signed by (Firm Official) Johnny J Doff
and
(Operator) Johnny J Doff

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
8/90

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER
Name Roberts Farm (Sid and Brad Roberts)
Address 1469 Larsen Rd Weiser Id. 83672
Drilling Permit No. 92-92-1-006 (well 1)
Water Right Permit No.

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

3. PROPOSED USE
☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other (specify type)

4. METHOD DRILLED
☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other

5. WELL CONSTRUCTION
Casing schedule: ☒ Steel ☐ Concrete ☐ Other

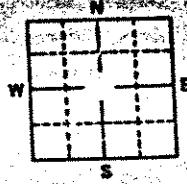
Thickness	Diameter	From	To
.250 inches	6 inches	+ 2 feet	40 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation inches by inches

Number		From	To
perforations		feet	feet
perforations		feet	feet
perforations		feet	feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name Model No.
Type Set from feet to feet
Diameter Slot size Set from feet to feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel
Placed from feet to feet
Surface seal depth 38 Material used in seal ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐
Sealing procedure used: ☐ Slurry pit ☒ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld
☐ Cemented between strata
Describe access port

6. LOCATION OF WELL 1463 Larsen RD
Sketch map location must agree with written location.



Subdivision Name 920445
Govt. Lt. 2
Lot No. X, 62, 38 Block No. X, 72, 49
County Washington
¼ ¼ Sec. 21, T. 10 N ☒ S ☐ R. 5 E ☐ W ☒

7. WATER LEVEL
Static water level Dry feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow
Artesian closed-in pressure p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature °F. Quality
Describe artesian or temperature zones below

8. WELL TEST DATA
☐ Pump ☐ Bailer ☒ Air ☐ Other

Discharge G.P.M.	Pumping Level	Hours Pumped
0	565	1

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
10	0	15	Brown Clay		
10	15	30	Sand and Gravel	X	
10	30	38	Blue Clay		
6	38	365	Blue Clay		

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OCT 26 1992 OCT 01 1992
Department of Water Resources Department of Water Resources

10. Work started 8-01-92 finished 8-03-92

11. DRILLERS CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Firm Name Dallas Drilling and Pump Co., Inc. Firm No. 445
Address 505 So. 18th St. Payette Id. 83661 Date 9-29-92
Signed by (Firm Official)
and
(Operator)

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

MALA 3006

RECEIVED
MAR 18 1994
WATER RESOURCES DEPT.
SALEM, OREGON

16S/4E/24ac
(START CARD) # 18568

(1) OWNER: Well Number 18568
Name Big Sky Farms Inc.
Address 3270 E. 7th St.
City Wieser State Ida Zip 83672

(2) TYPE OF WORK:
☑ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:
☑ Rotary Air ☑ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☑ Irrigation
☐ Thermal ☐ Injection ☐ Other Irrig test.

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☑ No Depth of Completed Well 500 ft.
Explosives used ☐ Yes ☑ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
16	0	56	Cgrout	0	56	36
9	56	500				

How was seal placed: Method ☐ A ☑ B ☐ C ☐ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12	+1	56	280	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner: No					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 56 ft.

(7) PERFORATIONS/SCREENS: No
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
90		200	1 hr.

Temperature of Water 57° Depth Artesian Flow Found No
Was a water analysis done? No ☐ Yes By whom
Did any strata contain water not suitable for intended use? No ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Malheur Latitude Longitude
Township 16 N or S Range 47 E or W WM.
Section 24 SW ¼ NE ¼
Tax Lot 2401 Lot Block Subdivision
Street Address of Well (or nearest address) Lon Sing Rd
Ontario Ore 97914

(10) STATIC WATER LEVEL:
21 ft. below land surface. Date 1-15-94
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 22

From	To	Estimated Flow Rate	SWL
22	42	150gal	21
64	67	90	21

(12) WELL LOG:
Ground elevation 0

Material	From	To	SWL
Sandy Clay Brown	0	22	21
Sand & Large boulders	22	42	21
Blue Clay	42	64	0
Fractured Blue Claystone	64	67	21
Blue Claystone &	67	500	0
siltstone Similar &			
Consistent formation			

Date started 12-25-93 Completed 1-5-94

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Frank L. Kelly WWC Number 789
Date 1-20-94

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed Frank L. Kelly WWC Number 789
Date 1-20-94

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 10/91

RECEIVED

NOV 21 1996

WATER RESOURCES DEPT.
SALEM, OREGON

MALH 50397

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # _____ (START CARD) # 94824

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number L06852

Name Max Mills

Address 1141 SW 3 Ave

City Ontario State OR Zip 97918

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger

☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☒ No Depth of Completed Well 520 ft.

Explosives used ☐ Yes ☒ No Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	93	Cement grout	10	93	36
8	+1	520	Bentonite	0	10	7

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☒ Other Bentonite was dry from surface

Backfill placed from _____ ft. to _____ ft. Material _____

Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	9	+1	84	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 84 ft

(7) PERFORATIONS/SCREENS:

☐ Perforations Method _____

☐ Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☒ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
8-10	253 ft		1 hr.
			3 hrs

Temperature of water 63° Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____

Depth of strata: _____

(9) LOCATION OF WELL by legal description:

County Malheur Latitude _____ Longitude _____

Township 17 S ☒ or S Range 47 E E or W M.

Section 16 SE 1/4 NW 1/4

Tax Lot 5102 Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address) Highline Rd Hwy 201

(10) STATIC WATER LEVEL:

147 ft. below land surface. Date 10-17-96

Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:

Depth at which water was first found 150 ft

From	To	Estimated Flow Rate	SWL
150 ft	182	1-2 GPM	147 ft
475	505	8-10 GPM	147

(12) WELL LOG:

Ground Elevation _____

Material	From	To	SWL
Sandy Soil	0	8	
Hardpan	8	12	
Sandy Brn clay	12	49	
Gravel	49	79	
Brn clay	79	150	
Brn Sandy clay	150	182	147
Hard Brn clay	182	189	
Blue clay	189	385	
Hard Blue clay	385	387	
Blue clay	387	475	
Grey Sandy clay	475	505	147
Grey clay	505	520	147

Date started 9-23-96 Completed 10-18-96

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number _____

Signed _____ Date _____

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1485

Signed Jon M Fyfe Date 11-14-96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

Form 238-7
8/90

#2

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name American Fire Foods
Address 25 North 6th St Payette Idaho
Drilling Permit No. 65-91-42-014
Water Right Permit No. _____

2. NATURE OF WORK

☑ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

3. PROPOSED USE TEST WELL #2

☐ Domestic ☐ Irrigation ☑ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☑ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☑ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.250 inches	8 inches	+ 1 feet	24 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

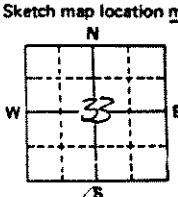
Was casing drive shoe used? ☑ Yes ☐ No
Was a packer or seal used? ☐ Yes ☑ No
Perforated? ☐ Yes ☑ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☑ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☑ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 18 Material used in seal: ☐ Cement grout ☑ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☑ Overbore to seal depth
Method of joining casing: ☐ Threaded ☑ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port Key Plug

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Payette
SE ¼ NW ¼ Sec. 33, T. 9 N ☒ S ☐ R. 5 E ☐ W ☒

7. WATER LEVEL

Static water level 2 feet below land surface.
Flowing? ☐ Yes ☐ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 70 °F. Quality fair gassy
Describe artesian or temperature zones below

8. WELL TEST DATA

☐ Pump ☐ Bailer ☑ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
300	440	7

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
12	0	11	Brown Soil		✓
12	11	16	Blue Clay		✓
12	16	18	Blue Clay		✓
8	18	445	Blue Clay		✓
8	445	470	Broken Sandstone & Sand	✓	

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OCT 25 1991
Department of Water Resources
Western Regional Office

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DEC 04 1991
Department of Water Resources

10. Work started Apr 8-91 finished _____

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Frank Shelley Firm No. 326
Address 960 NW 19th Ave Payette Date _____
Signed by (Firm Official) Frank Shelley
and
(Operator) Frank Shelley

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

WATER WELL REPORT
STATE OF OREGON

RECEIVED
MAY 30 1985
WATER RESOURCES DEPT
SALEM, OREGON

Malh 1499

State Well No. 18S/47E-7bb

State Permit No.

(1) OWNER:
Name ONTARIO GOLF COURSE
Address P. O. BOX 24
City ONTARIO State OREGON

(2) TYPE OF WORK (check):
New Well XX Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air XX Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation XX Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel XX Threaded ☐ Plastic ☐ Welded XX
8" Diam. from 2 ft. to 10 ft. Gauge .250
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS: Perforated? XX Yes ☐ No
Type of perforator used TORCH
Size of perforations 3/16 in. by 5 in.
150 perforations from 30 ft. to 45 ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes XX No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? XX Yes ☐ No If yes, by whom? DALLAS DRILLING
Yield: 110g.p.m. gal./min. with ft. drawdown after hrs.
" (PUMP TEST) " "
Air test 100+ gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 58 Depth artesian flow encountered ft.

(9) CONSTRUCTION: Special standards: Yes ☐ No ☐
Well seal—Material used CEMENT
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 14 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 12 + 5% bentonite sacks
How was cement grout placed? pumped through 1" grout pipe
Was pump installed? no Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? XX Yes ☐ No Size of gravel: 3/8
Gravel placed from 35 ft. to 40 ft.

(10) LOCATION OF WELL:
County MALHEUR Driller's well number
NW ¼ NW ¼ Section 7 T. 18 S R. 47E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:

(11) WATER LEVEL: Completed well.
Depth at which water was first found 35 ft.
Static level 18 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 8
Depth drilled 220 ft. Depth of completed well 220 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BROWN CLAY	0	30	
SAND	30	33	
SAND GRAVEL	33	40	18
BLUE CLAY	40	80	
BLACK SAND	80	81	18
BLUE CLAY	81	116	
BLACK SAND	116	117	18
BLUE CLAY	117	220	

Work started 5/15 19 85 Completed 5/17 19 85
Date well drilling machine moved off of well 5/17/85 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] (Drilling Machine Operator) Date , 19
Drilling Machine Operator's License No.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name DALLAS DRILLING & PUMP CO., INC. (Person, firm or corporation) (Type or print)
Address 505 So. 18th St. PAYETTE, IDAHO 83661
[Signed] (Water Well Contractor)
Contractor's License No. 682 Date 5/20/85, 19

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12658-690

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

******NOTICE*****

PLEASE BE ADVISED THIS REPORT IS BEING FILED TO AMEND A PREVIOUSLY FILED WELL REPORT FILED WITH THE STATE OF OREGON 5/17/85 SAME OWNER, SAME LEGAL DESCRIPTION, SAME DRILLING COMPANY

PLEASE TYPE or PRINT IN INK

(Start official use only)

(1) OWNER:

Name ONTARIO GOLF COURSE - (L. WESTCOTT)

Address P. O. BOX 24

City ONTARIO, OREGON 97914 State

(2) TYPE OF WORK (check):

New Well XX Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air XX Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐

Other: Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

Steel Threaded XX ☐ Plastic ☐ Welded ☐ XX

8 " Diam. from 2 ft. to 50 ft. Gauge .250

" Diam. from ft. to ft. Gauge

LINER INSTALLED:

Steel Threaded ☐ Plastic ☐ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☐ No

Size of perforations in. by in.

perforations from ft. to ft.

SEE PREVIOUS REPORT perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☐ No

Manufacturer's Name

Type Model No.

SEE PREVIOUS REPORT Diam. Slot Size Set from ft. to ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

" " "

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☐

Well seal—Material used

Well sealed from land surface to ft.

Diameter of well bore to bottom of seal in.

Diameter of well bore below seal in.

Amount of sealing material sacks ☐ pounds ☐

How was cement grout placed?

Was pump installed? Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☐ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☐ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:

County MALHEUR NW ¼ NW ¼ of Section 7 of

Township 18 South (Township is North or South), Range 47 East (Range is East or West), WM.

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address)

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found ft.

Static level ft. below land surface. Date

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing

Depth drilled ft. Depth of completed well ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
** THIS FILING IS AN AMENDED WELL REPORT, THE AMENDMENT IS TO SECTION #5. PLEASE NOTICE THE CASING INSTALLED WAS FROM 2ft. TO 50ft. PLEASE AMEND THE ORIGINAL WELL REPORT WHICH READ 10ft. ALL OTHER INFORMATION IS THE SAME AS PREVIOUSLY FILED.			

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JAN 23 1986

WATER RESOURCES DEPT

SALEM, OREGON

Date work started /completed

Date well drilling machine moved off of well 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Date , 19

(bonded) Water Well Constructor Certification:

Bond 2354454 (number) Issued by: WESTERN SURETY (Surety Company Name)

On behalf of JOHNNY L. GORE (Type or print name of Water Well Constructor)

DALLAS DRILLING & PUMP CO.

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

(Signed) (Water Well Constructor)

(Dated) 1/14/86

NOTICE TO WATER WELL CONSTRUCTOR

The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*46866-690

RECEIVED
JUL 22 1985
WATER RESOURCES DEPT
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

****NOTICE****
PLEASE BE ADVISED, THIS REPORT PERTAINS TO THE DEEPENING OF AN EXISTING WELL, REPORT PREVIOUSLY FILED. SAME OWNER. SAME LEGAL. DATE WORK PREV. COMPLETED - 5/17/85. SAME DRILLING COMPANY.

1500 Mall

State Well No. 18S/47E-7bb

State Permit No. deep.

(1) OWNER:
Name ONTARIO GOLF COURSE -(L. WESTCOTT)
Address P. O. BOX 24
City ONTARIO, OREGON 97914 State

(2) TYPE OF WORK (check):
New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☐ Plastic ☐
Threaded ☐ Welded ☐
EXISTING INFO.
..... " Diam. from ..... ft. to ..... ft. Gauge .....
..... " Diam. from ..... ft. to ..... ft. Gauge .....

LINER INSTALLED:
..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☐ No
Type of perforator used EXISTING INFO.
Size of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☐ No
Manufacturer's Name EXISTING INFO.
Type ..... Model No. .....
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" ..... " ..... " ..... "
Air test ..... gal./min. with drill stem at ..... ft. ..... hrs.
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m.
Temperature of water ..... Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☐
Well seal—Material used EXISTING INFO.
Well sealed from land surface to ..... ft.
Diameter of well bore to bottom of seal ..... in.
Diameter of well bore below seal ..... in.
Number of sacks of cement used in well seal ..... sacks
How was cement grout placed? .....
Was pump installed? ..... Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☐ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? ..... depth of strata .....
Method of sealing strata off .....
Was well gravel packed? ☐ Yes ☐ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:
County MALHEUR Driller's well number .....
NW ¼ NW ¼ Section 7 T. 18S R. 47E W.M.
Tax Lot # ..... Lot ..... Blk ..... Subdivision .....
Address at well location: .....

(11) WATER LEVEL: Completed well.
Depth at which water was first found EXISTING INFO. ft.
Static level ..... ft. below land surface. Date .....
Artesian pressure ..... lbs. per square inch. Date .....

(12) WELL LOG:
Diameter of well below casing .....
Depth drilled EXISTING INFO. Depth of completed well ..... ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
DEEPENING INFO.			
SHALE GREY	220	335	
SAND FINE BLACK	335	336	18'
SHALE GREY	336	750	
SAND FINE BLACK CEMENTED	750	755	18'
SHALE GREY	755	765	

Work started 6/17/85 19 Completed 6/19/85 19
Date well drilling machine moved off of well 6/19/85 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] ..... (Drilling Machine Operator) Date 7-23 19 85
Drilling Machine Operator's License No. 165

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name DALLAS DRILLING & PUMP CO., INC. (Person, firm or corporation) (Type or print)
Address 505 So. 18th St. PAYETTE, IDAHO 83661
[Signed] ..... (Water Well Contractor)
Contractor's License No. 682 Date 7/11/85 19

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12658-690

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED
MAY 23 1986
WATER RESOURCES DEPT
SALEM, OREGON

PLEASE TYPE or PRINT IN INK

March 1723

18s/47E-30bc

(for official use only)

(1) OWNER:

Name: MALHEUR EXPERIMENTAL STATION

Address: RT. 1 BOX 620

City: ONTARIO OREGON 97914 State

(2) TYPE OF WORK (check):

New Well [XX] Deepening [ ] Reconditioning [ ] Abandon [ ]

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air [XX] Driven [ ]

Rotary Mud [XX] Dug [ ]

Cable [ ] Bored [ ]

(4) PROPOSED USE (check):

Domestic [XX] Industrial [ ] Municipal [ ]

Irrigation [ ] Thermal: [ ] Withdrawal [ ] Reinjection [ ]

Other: [XX]

Piezometric [ ] Grounding [ ] Test [ ]

(5) CASING INSTALLED:

Steel [XX] Threaded [ ] Plastic [ ] Welded [XX]

6 in. Diam. from 2 ft. to 134 ft. Gauge .250

" Diam. from ft. to ft. Gauge

LINER INSTALLED:

Steel [ ] Threaded [ ] Plastic [ ] Welded [ ]

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? [ ] Yes [XX] No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? [ ] Yes [XX] No

Manufacturer's Name

Type Model No.

Diam. Slot Size Set from ft. to ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? [XX] Yes [ ] No If yes, by whom? DALLAS DRILLING

40 gal./min. with 51' ft. drawdown after 2 hrs.

Air test 45 gal./min. with drill stem at 220 ft. 2 hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes [ ] No [X]

Well seal—Material used CEMENT TYPE 1 &11

Well sealed from land surface to 126 ft.

Diameter of well bore to bottom of seal 10 x 12 in.

Diameter of well bore below seal ~~10 x 12~~ 6 in.

Amount of sealing material 35 + bentonite sacks [X] pounds [ ]

How was cement grout placed? PUMPED THROUGH 126' of 1" GROUT PIPE TO LAND SURFACE

Was pump installed? YES Type SUB HP 1½ Depth 109 ft.

Was a drive shoe used? [XX] Yes [ ] No Plugs Size: location ft.

Did any strata contain unusable water? [ ] Yes [XX] No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? [ ] Yes [XX] No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:

County MALHEUR SW ¼ NW ¼ of Section 30 of

Township 18 South (Township is North or South) Range 47 East (Range is East or West) WM.

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address)

SAME AS OWNER ADDRESS

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 67 ft.

Static level 29 ft. below land surface. Date 3/10/86

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 6"

Depth drilled 220 ft. Depth of completed well 220 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
SANDY CLAY	0	15	
DRY CEMENTED GRAVEL	15	40	
BROWN CLAY	40	67	
SAND, SILT, GRAVEL	67	73	30
SILT STONE	73	112	
BLUE CLAY	112	130	
HARD BLUE SHALE	130	136	
BLACK AND GREY SANDSTONE	136	137	30
BLUE SHALE	137	140	
GREY SANDSTONE	140	141	30
BLUE SHALE	141	148	
GREY SANDSTONE	148	150	30
BLUE SHALE	150	175	
GREY SANDSTONE	175	177	30
GREY CLAY	177	220	

Date work started 3/8/86 /completed 3/13/86

Date well drilling machine moved off of well 3/13/86 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Date , 19

(bonded) Water Well Constructor Certification:

Bond 2354454 (number) Issued by: WESTERN SURETY (Surety Company Name)

On behalf of JOHNNY GOFF (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

(Signed) John L. Goff (Water Well Constructor)

(Dated) 3/28/86

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP*46866-690

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED JUL 7 1964 STATE ENGINEER SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

19 147 - 29da

March 1974

State Well No. .....

State Permit No. .....

(1) OWNER:
Name Idaho Canning Company
Address Payette Idaho

(2) LOCATION OF WELL:
County Malheur Driller's well number 117
¼ ¼ Section 28 T. 19W R. 5W W.M.
Bearing and distance from section or subdivision corner
Town: Lot At Idaho Canning Co.
Nyssa Oregon

(3) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☑ Other ☐

(5) TYPE OF WELL:
Rotary ☑ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☐
..... " Diam. from None ft. to ..... ft. Gage .....
..... " Diam. from ..... ft. to ..... ft. Gage .....
..... " Diam. from ..... ft. to ..... ft. Gage .....

(7) PERFORATIONS:
Perforated? ☐ Yes ☐ No
Type of perforator used None
Size of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(8) SCREENS:
Well screen installed? ☐ Yes ☐ No
Manufacturer's Name None
Type ..... Model No. .....
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(9) CONSTRUCTION:
Well seal—Material used in seal Bentonite (See Note)
Depth of seal 0-40' ft. Was a packer used? Yes
Diameter of well bore to bottom of seal 9 7/8 in.
Were any loose strata cemented off? ☐ Yes ☑ No Depth .....
Was a drive shoe used? ☐ Yes ☑ No
Was well gravel packed? ☐ Yes ☑ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.
Did any strata contain unusuable water? ☑ Yes ☐ No
Type of water? Hard depth of strata 15-40
Method of sealing strata off Bentonite

(10) WATER LEVELS:
Static level 9' ft. below land surface Date 6/3/64
Artesian pressure ..... lbs. per square inch Date .....

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "
Bailer test 200 gal./min. with 5 ft. drawdown after 2 hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water 60 Was a chemical analysis made? ☐ Yes ☑ No

(12) WELL LOG:
Diameter of well below casing 9 7/8
Depth drilled 562 ft. Depth of completed well 562 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Soil Top	0	5
Sand Fine Silty	5	15
Sand Med. To Coarse (Water)	15	30
Gravel Fine To Med (Water)	30	40
Clay Blue	40	255
Clay Blue Streaks Brown Sand	255	275
Clay Blue	275	562

Note
Hole Filled with Bentonite From bottom to 40'. Wood plug set at 40' and hole filled with Bentonite To Surface.

Work started 5/25 1964 Completed 6/3/ 1964
Date well drilling machine moved off of well 6/16/ 1964

(13) PUMP:
Manufacturer's Name .....
Type: ..... H.P. .....

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
NAME Otto Ellsworth (Person, firm or corporation) (Type or print)
Address P.O. Box 471 Island City, Oregon
Drilling Machine Operator's License No. 282
[Signed] Otto Ellsworth (Water Well Contractor)
Contractor's License No. 298 Date July 5, 19 64

(USE ADDITIONAL SHEETS IF NECESSARY)

MALH 5029G

RECEIVED
AUG 26 1996
WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(START CARD) # 66463

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number
Name Mark Ward
Address P.O. Box 23606
City Tigard State OR Zip 97223

(2) TYPE OF WORK
☑ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☑ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☑ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☑ No Depth of Completed Well 390 ft.
Explosives used ☐ Yes ☑ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10	0	25	Bentonite	0	25	700

How was seal placed: Method ☐ A ☐ B ☑ C ☐ D ☐ E
☑ Other Bentonite
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	1	140	.250	☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 140

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☑ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
~10		390	2hr/1 hr.

Temperature of water 64° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Malheur Latitude Longitude
Township 19 ☐ N or ☑ S Range 46 ☑ E or W. WM.
Section 25 SW 1/4 SW 1/4
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address) 3125 Shag Way

(10) STATIC WATER LEVEL:
84 ft. below land surface. Date 7-18-96
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 135

From	To	Estimated Flow Rate	SWL
135	145	~10	84

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Cemented Gravel	0	7	
Brown Silty Clay	7	135	
Blue Silt	135	145	84
Blue Clay	145	390	

Date started 7-16-96 Completed 7-18-96

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 682
Signed Date

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

MALH 30296

RECEIVED
AUG 26 1996
WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(START CARD) # 66463

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number
Name Mark Ward
Address P.O. Box 2366
City Nyssa State OR Zip 97913

(2) TYPE OF WORK
☑ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☑ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☑ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☑ No Depth of Completed Well 390 ft.
Explosives used ☐ Yes ☑ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10	0	25	Bentonite	0	25	700

How was seal placed: Method ☐ A ☐ B ☑ C ☐ D ☐ E
☑ Other Bentonite
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	1	140	.250	☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 140

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☑ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
~10		390	2hr 1 hr.

Temperature of water 64° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Malheur Latitude Longitude
Township 19 ☐ N or ☑ S Range 46 ☑ E or W. WM.
Section 25 SW 1/4 SW 1/4
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address) 3125 Shag Way

(10) STATIC WATER LEVEL:
84 ft. below land surface. Date 7-18-96
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 135

From	To	Estimated Flow Rate	SWL
135	145	~10	84

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Cemented Gravel	0	7	
Brown Silty Clay	7	135	
Blue Silt	135	145	84
Blue Clay	145	390	

Date started 7-16-96 Completed 7-18-96

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 682
Signed Date

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

9

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

MALH 2735

RECEIVED APR 29 1992 WATER RESOURCES SALEM, OREGON

20S/46E/24cc

(START CARD) # 16036

(1) OWNER:

Well Number

Name Alan Peterson

Address 2678 Hwy 201

City Nyssa State OR Zip 97913

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD

☒ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval Yes ☐ No ☒ Depth of Completed Well 700 ft.

Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10"	0	30	Cement	0	30	12 sacks

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☒ Other 690-210-340 (1)

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	59	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 59'

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
20-25		300'	1 hr.

Temperature of water 78 Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☒ Other Surface water

Depth of strata: 17-30

(9) LOCATION OF WELL by legal description:

County Malheur Latitude Longitude

Township 20 N or S Range 46 E or W WM.

Section 24 SW ¼ SW ¼

Tax Lot 2700 Lot Block Subdivision

Street Address of Well (or nearest address) 2628 Hwy 201 Nyssa, OR

(10) STATIC WATER LEVEL:

18 ft. below land surface. Date 3-31-92

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 18'

From	To	Estimated Flow Rate	SWL
18	30	30-40	~~18~~
684	700	20-25	18

(12) WELL LOG:

Ground elevation

Material	From	To	SWL
Top soil	0	17	–
Sand & gravel	17	29	18
Brown clay	29	47	–
Blue clay	47	684	–
Black sand	685	700	18

Date started 3-20-92 Completed 3-25-92

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number 1510

Signed Dave Clem Date 4-20-92

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1506

Signed Date 4-20-92

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 3/88

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON within 30 days from the date of well completion.

RECEIVED
NOV 20 1978
WATER RESOURCES DEPT.
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print) (Do not write above this line)

State Well No. 21S/46E-15da
State Permit No.

(1) OWNER:
Name Adrian City
Address Adrian Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☒
8 " Diam. from 0 ft. to 27 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS: Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Page Bros
Yield: 55 gal./min. with 395 ft. drawdown after 13 hrs.
" " " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 76 Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 27 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 5 sacks
How was cement grout placed? Pressure grouted
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Malheur Driller's well number
N.E ¼ S.E ¼ Section 15 T. 21 R. 46 W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 388 ft.
Static level 4 ft. below land surface. Date 10-23-78
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 8
Depth drilled 536 ft. Depth of completed well 536 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
sticky clay	0	42	
Blue shale	42	388	
Coarse black sand	388	408	
Fine sand & shale	408	432	
Fine Sand stone & clay	432	536	

Work started 10-18-78 19 Completed 10-23-78 19
Date well drilling machine moved off of well 10-24-78 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] (Drilling Machine Operator) Date 11-2-78 19
Drilling Machine Operator's License No. 65

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name PAGE BROTHERS DRILLING (Person, firm or corporation) (Type or print)
Address RT. 2 BOX 371= VALE, OREGON 97918
[Signed] (Water Well Contractor)
Contractor's License No. 564 Date 11-2-78, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45658-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

Mail 2251

RECEIVED
OCT 17 1974
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON (Please type or print) (Do not write above this line)

State Well No. 21S/46E-22bc
State Permit No.

(1) OWNER:
Name BOB E. Harlow
Address Adrian Ore

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☑ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☑
6" Diam. from +1 ft. to 308 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☑ Yes ☐ No If yes, by whom? Driller
Yield: 25 gal./min. with 50 ft. drawdown after 2 hrs.
" " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Bentonite
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal sacks
Number of sacks of bentonite used in well seal 6 sacks
Brand name of bentonite Gifford Bon Jell #2
Number of pounds of bentonite per 100 gallons of water 65 lbs./100 gals.
Was a drive shoe used? ☑ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Malheur Driller's well number
SW ¼ NW ¼ Section 22 T. 21 R. 46 E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 204 ft.
Static level 191 ft. below land surface. Date 8-9-74
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 5
Depth drilled 520 ft. Depth of completed well 520 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Brown sand	0	18	
Red Gravel & Clay Brown	18	28	
Sand & Red Gravel	28	93	
Red Brown Sand	93	130	
Brown Sand & Stone	130	160	
Brown Sandy Clay	160	189	
Brown Clay	189	204	✓
Red Gravel	204	237	
Brown Sandy Clay	237	271	
Blue Clay	271	284	
Brown Sandy Clay	284	306	
Blue Clay Sandy	306	318	
Blue Clay	318	405	
Blue Clay	405	438	
Red Gravel	438	442	
Blue Clay	442	469	
Blue Clay	469	504	
Red Gravel	504	505	
Blue Clay	505	520	

Work started 7-31 1974 Completed 9-12 1974
Date well drilling machine moved off of well 9-12 1974

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Lee L Wallace (Drilling Machine Operator) Date Sept 30, 1974
Drilling Machine Operator's License No. 101

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name HAROLD HARTLING (Person, firm or corporation) (Type or print)
Address BOX 124 ONTARIO ORE.
[Signed] Harold E. Hartling (Water Well Contractor)
Contractor's License No. 273 Date Sept 30, 1974

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

Malh 2251

RECEIVED

WATER WELL REPORT
STATE OF OREGON

OCT 17 1974

State Well No. 21S/46E-22bc

(Please type or print) STATE ENGINEER State Permit No. .....

(Do not write above this line) SALEM, OREGON

(1) OWNER:
Name Bob [illegible] Owner
Address Adrian Ore

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☑ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☑
6" Diam. from 4.1 ft. to 308 ft. Gage .250
..." Diam. from ..... ft. to ..... ft. Gage .....
..." Diam. from ..... ft. to ..... ft. Gage .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Type of perforator used .....
Size of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☑ Yes ☐ No If yes, by whom? Driller
Yield: 25 gal./min. with 50 ft. drawdown after 2 hrs.
" ..... " ..... " .....
" ..... " ..... " .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m.
Temperature of water ..... Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Well seal—Material used Bentonite
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal ..... sacks
Number of sacks of bentonite used in well seal 6 sacks
Brand name of bentonite Enfield Bon Jell #2
Number of pounds of bentonite per 100 gallons of water 65 lbs./100 gals.
Was a drive shoe used? ☑ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? ..... depth of strata .....
Method of sealing strata off .....
Was well gravel packed? ☐ Yes ☐ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:
County Malheur Driller's well number .....
SW ¼ NW ¼ Section 22 T. 21 R. 46 E W.M.
Bearing and distance from section or subdivision corner .....

(11) WATER LEVEL: Completed well.
Depth at which water was first found 204 ft.
Static level 191 ft. below land surface. Date 8-9-74
Artesian pressure ..... lbs. per square inch. Date .....

(12) WELL LOG:
Diameter of well below casing 2
Depth drilled 520 ft. Depth of completed well 520 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Brown sand	0	18	
Red Gravel & Clay Brown	18	28	
Sand & Red Gravel	28	93	
Blue Brown Sand	93	130	
Brown Sand Stone	130	160	
Brown Sandy Clay	160	189	
Brown Clay	189	204	✓
Red Gravel	204	237	
Brown Sandy Clay	237	271	
Blue Clay	271	284	
Brown Sandy Clay	284	306	
Blue Clay Sandy	306	318	
Blue Clay	318	405	
Blue Clay	405	438	
Red Gravel	438	442	
Blue Clay	442	469	
Blue Clay	469	504	
Red Gravel	504	505	
Blue Clay	505	520	

Work started 7-31 - 1974 Completed 9-12 1974
Date well drilling machine moved off of well 9-12 1974

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Lee L Wallace (Drilling Machine Operator) Date Sept 30, 1974
Drilling Machine Operator's License No. 121

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name HAROLD HARTLING (Person, firm or corporation) (Type or print)
Address BOX 124 ONTARIO ORE.
[Signed] Harold E. Hartling (Water Well Contractor)
Contractor's License No. 273 Date Sept 30, 1974

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

Malh 2251 N

RECEIVED
OCT 17 1974
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

State Well No. 21S/46E-22bc
(Please type or print) State Permit No.
(Do not write above this line)

(1) OWNER:
Name BOB [illegible] Harrison
Address Adrian, Ore.

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☑ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☑
6" Diam. from 4 ft. to 308 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☑ Yes ☐ No If yes, by whom? Driller
Yield: 25 gal./min. with 50 ft. drawdown after 2 hrs.
" " "
" " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Bentonite
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal sacks
Number of sacks of bentonite used in well seal 6 sacks
Brand name of bentonite Baroid Ben-Seal #2
Number of pounds of bentonite per 100 gallons of water 65 lbs./100 gals.
Was a drive shoe used? ☑ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Malheur Driller's well number
SW ¼ NW ¼ Section 22 T. 21 R. 46 E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 204 ft.
Static level 191 ft. below land surface. Date 8-4-74
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 5
Depth drilled 520 ft. Depth of completed well 520 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Brown sand	0	18	
Pea Gravel & Clay Brown	18	28	
Sand & Pea Gravel	28	93	
Fine Brown Sand	93	130	
Brown Sand & Stone	130	160	
Brown Soapy Clay	160	189	
Brown Clay	189	204	✓
Pea Gravel	204	237	
Brown Soapy Clay	237	271	
Blue Clay	271	284	
Brown Streaky Clay	284	306	
Blue Clay Soapy	306	318	
Blue Clay	318	405	
Blue Clay	405	438	
Pea Gravel	438	442	
Blue Clay	442	469	
Blue Clay	469	504	
Pea Gravel	504	505	
Blue Clay	505	520	

Work started 7-31 - 1974 Completed 9-12 1974
Date well drilling machine moved off of well 9-12 1974

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Lee O'Mailloux (Drilling Machine Operator) Date Sept 30, 1974
Drilling Machine Operator's License No. 101

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name HAROLD HARTLING (Person, firm or corporation) (Type or print)
Address BOX 124 ONTARIO ORE.
[Signed] Harold E. Hartling (Water Well Contractor)
Contractor's License No. 223 Date Sept 30, 1974

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

Cross section of the Treasure Valley in the Parma area for the TVHP (Treasure Valley Hydrologic Project):
Notes on Geology of the Parma area, Payette, Canyon and Owyhee Counties, Idaho

by Gregg Beukelman
Department of Geosciences, Boise State University
Boise, Idaho 83725
tele: 208-385-1631, fax 385-4061, email: gbeukelm@trex.idbsu.edu

February 8, 1997

Introduction

The report and enclosed data are a preliminary compilation of information along a transect extending NE-SW in the Parma area, to show the nature of the Late Cenozoic stratified sediments in the upper portion (~ 1000 feet) of the western Snake River Plain (Fig. 2). Included for each well along the transect are the well owner, Land Office Grid coordinates, surface elevation (± 10 feet), and diagrams of well construction and lithology. Lithology, taken from well drillers' reports on record at the Idaho Department of Water Resources and the U. S. Geological Survey, is plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers' reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area is included showing the route of the transect (A-A'), individual well owners and surface geology (taken from Othberg and Stanford, 1992).

Methods

The cross section included is a graphical presentation of subsurface lithologies based on water well drillers reports and data from a single deep exploration well (Highland L & L). Wells along a NE-SW transect were selected to ensure maximum section coverage and U. S. Geological Survey monitoring wells were included where possible. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (attached sheets). Correlations were made at this scale and all data digitized and reduced to produce the cross section in figure 2. Accuracy of all elevations is probably ± 10 feet. Elevations of the contacts at the top of the lacustrine claystone (+1340-ft) and the underlying basalt (-1200-ft) are taken from a lithologic log accompanying the drillers report for the Highland L & L exploration well (Minus signs indicate elevation below sea level).

Structure

The structural nature of this area of the plain is inferred to be a normal fault-bounded graben. Faults are thought to be older inactive structures owing to their lack of surface expression and no offset of Pleistocene gravels and overlying Bonneville Flood deposits. Evidence for a major fault north of and adjacent to the Snake River is the rather monotonous

thickness of clay seen in the wells to the south. These sediments have been interpreted by Ekren and others (1981) to be Miocene Poison Creek Formation. Clays of this thickness are not encountered across the fault in the shallow wells to the north but occur only at much greater depth in the Highland L & L well, suggesting a minimum offset of 350 feet. Several other normal faults are interpreted based on offset of a very distinctive color boundary between overlying brown sediments and underlying blue sediments. One such fault occurring south of the Highland L & L well correlates with a similarly north facing normal fault that offsets basalt at depth (basalt at -1200-ft elevation in the Highland L & L well) as interpreted by Wood (1997). Based on the sediment color change boundary, the section appears to have no discernable dip (0.04° to the south between the Obendorf and City of Parma wells).

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits overlying a basement of basalt that varies in elevation along the profile from -1200-ft to -3200-ft. Surficial sediments include modern flood plain deposits, Bonneville Flood slack water fine sediments, gravel deposits of Pleistocene age, and older Tertiary age sediments. Much of the middle portion of the transect is mantled by silts and clays of Bonneville Flood slack water origin. These fine sediments commonly overlie terrace gravels including from youngest to oldest: Gravel of Boise Terrace, Gravel of the Bonneville Flood scoured Whitney Terrace, Gravel of Whitney Terrace, and Gravel of Deer Flat Terrace.

Beneath the surficial sediments occur a complex sequence of interfingering gravels, sands and clays which are interpreted to represent fluvial and shallow lacustrine deposits. This section contains an upper portion in which sediments are commonly some shade of brown and a deeper portion having sediments that are described as blue in drillers logs. The boundary between these color-defined units occurs at 2200-ft ± 50 ft elevation and appears in all well logs. The nature of this type of boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. A complication to this interpretation is the effect of recharge by oxygenated waters on reduced (blue) iron minerals. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. Evidence in the Parma area, such as the uniform elevation of the contact and its lack of any identifiable deflection in the Boise River or Snake River areas (which might be thought to be recharge sources), suggests that this brown-blue contact is the result of original diagenesis and not greatly affected by later recharge. Therefore, this oxidation/reduction contact may well be useful for geologic interpretation of depositional environments.

North of the major fault in the Snake River area, the deeper part of the sedimentary section is composed of ~ 3000 feet of lacustrine claystone having an upper contact at +1340-ft elevation as recorded in the Highland L & L well. The geometry of the upper contact of this claystone cannot be determined from this cross section as only one well (Highland L & L) penetrates it to any depth. This contact is overlain by the fluvial lacustrine section containing a

significant aquifer section about 1290 feet thick. From water levels in nearby wells (Fig. 2) it appears that its upper 250 feet may be unsaturated. The base of this section, containing sand aquifers, is the top of the pro-delta mudstone facies interpreted by Wood (1994).

Basalt forms a volcanic basement to the sedimentary section. The Highland L & L well penetrates the top of basalt at -1200-ft elevation. Elsewhere along the transect, the topography of the basalt upper contact, as interpreted by Wood (1997) from seismic reflection data, mimics the graben form of the basin. Elevations of the basalt surface range from -2200-ft near the ends of cross section to about -3200-ft beneath the Boise River.

Hydrogeology

The static water level in wells on this transect vary greatly having a range of 180 feet and no easily discernable trends with the exception of a decline in the proximity of the Boise River. Static level in wells completed in the thick Tertiary sediment section north of the Boise Valley range from 2300-ft to 2380-ft elevation. Southward, within the Boise Valley and north of the Boise River, the level drops to about 2200-ft. Between the Boise River and the Snake River static water levels range from 2290-ft to 2340-ft with a trend of decreasing elevation nearer the Boise River. Only one well south of the Snake River is included in the transect so no trend south of the river is evident but the one water level is similar to those north of the river.

Two wells included in this cross section are part of the U.S. Geological Survey monitoring well program. The Skogsburg well (NW1/4,SW1/4,S.35,T6N,R5W) has a static water level of 2308-ft elevation as measured 3/21/96. The drillers found water in a sand and clay layer at a depth of 220-240 ft below the surface but the well is fully cased to its bottom at 322 ft making it likely that most of the water produced by this well is coming from a sand layer at its bottom (2073-ft elevation). The second well included in the monitoring program is the Paulson well (SE1/4,NW1/4,S.10,T4N,R5W) which has a static water level of 2340-ft elevation as measured 3/21/96. The drillers of this well report water in sandy and gravel units at 108'-125', 160'-165', 180'-250', and 300'-306' below land surface. The borehole is cased from the surface to the bottom (2117-ft elevation) with perforations in the bottom three feet making it likely that the principal water producer is a coarse sandy gravel at the bottom six feet of the borehole.

References

Idaho Department of Transportation, 1994, 30 X 60 minute series topographic map of Boise, Idaho, scale 1:100,000.

Idaho Department of Water Resources, 1997 microfiche file of drillers reports, Orchard Street Office.

Othberg, K.L., and Sanford, L.R., 1992, Geologic map of the Boise Valley and adjoining area, western Snake River Plain, Idaho: Idaho Geological Survey, Geologic Map Series, scale 1:100,000.

Ekren, E.B., McIntyre, D.H., and Bennett, E.H., 1981, Geologic map of Owyhee County, Idaho, west of Longitude 116° W: U.S. Geological Survey Miscellaneous Investigations Map I-1256, scale 1:125,000.

U.S. Geological Survey, 1990, Files on wells in observation network, Collins Road Office.

Wood, S.H., 1997, Structural contour map of the top of Miocene basalt basement rocks, western Snake River Plain, Idaho: Report for Idaho Department of Water Resources (2sheets, 1:100,000).

Wood, S.H., 1994, Seismic expression and geological significance of a lacustrine delta in Neogene deposits in the western Snake River Plain, Idaho: American Association of Petroleum Geologists Bulletin, v. 78, no. 1, p. 102-121.

Figures and enclosures

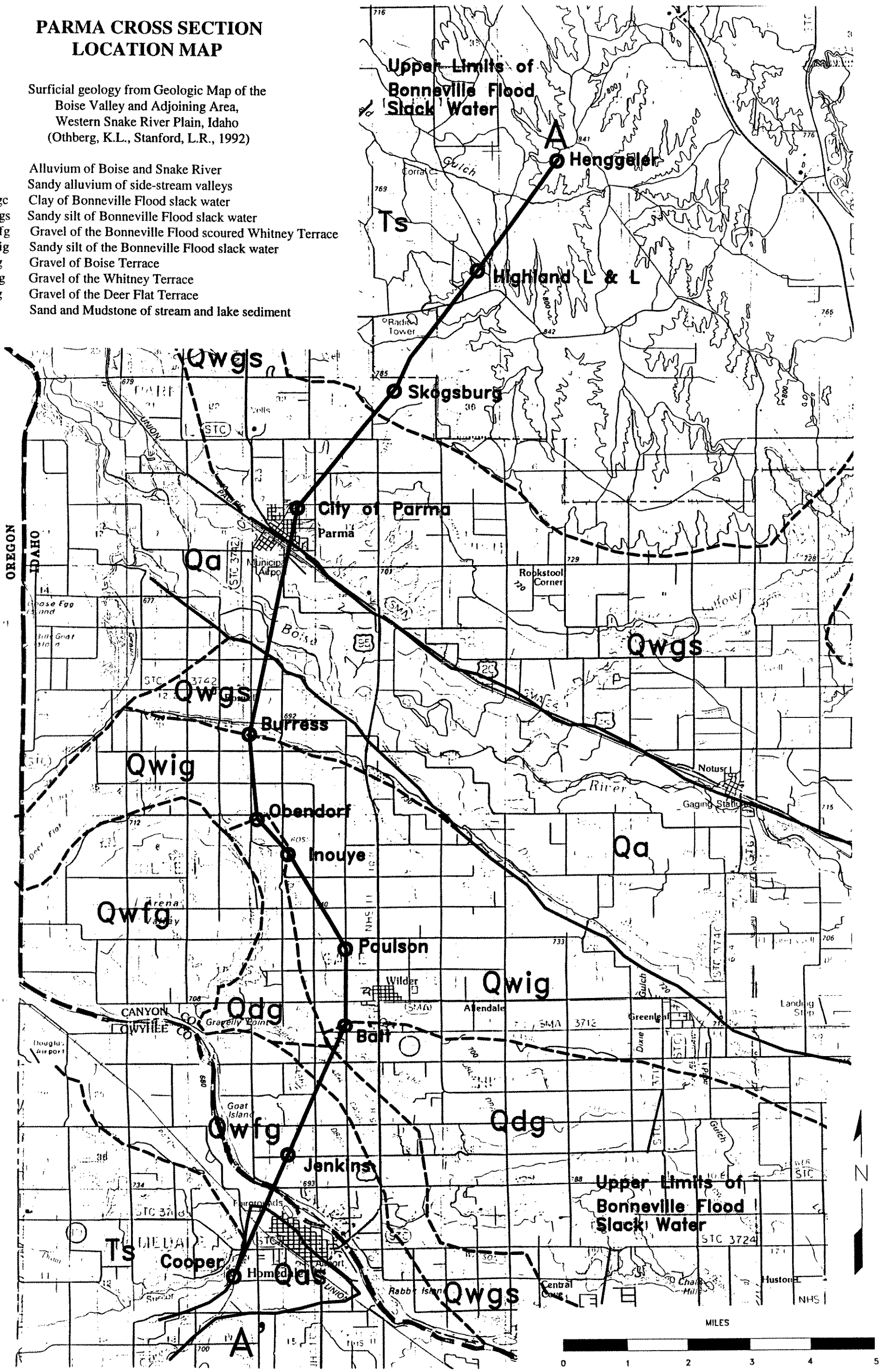
Figure 1	Map (1:100,000) showing cross section transect, wells used in cross section, and surficial geology.
Figure 2	Cross section of geology and hydrogeology across the western Snake River Plain in the Parma, Idaho area.
Figure 2a	Legend for cross section
Attached	Eight panels of wells used in cross section showing lithology and well construction.
Attached	Drillers reports of selected wells.

FIGURE 1

PARMA CROSS SECTION LOCATION MAP

Surficial geology from Geologic Map of the
Boise Valley and Adjoining Area,
Western Snake River Plain, Idaho
(Othberg, K.L., Stanford, L.R., 1992)

Qa	Alluvium of Boise and Snake River
Qas	Sandy alluvium of side-stream valleys
Qbgc	Clay of Bonneville Flood slack water
Qwgs	Sandy silt of Bonneville Flood slack water
Qwfg	Gravel of the Bonneville Flood scoured Whitney Terrace
Qwig	Sandy silt of the Bonneville Flood slack water
Qbg	Gravel of Boise Terrace
Qwg	Gravel of the Whitney Terrace
Qdg	Gravel of the Deer Flat Terrace
Ts	Sand and Mudstone of stream and lake sediment



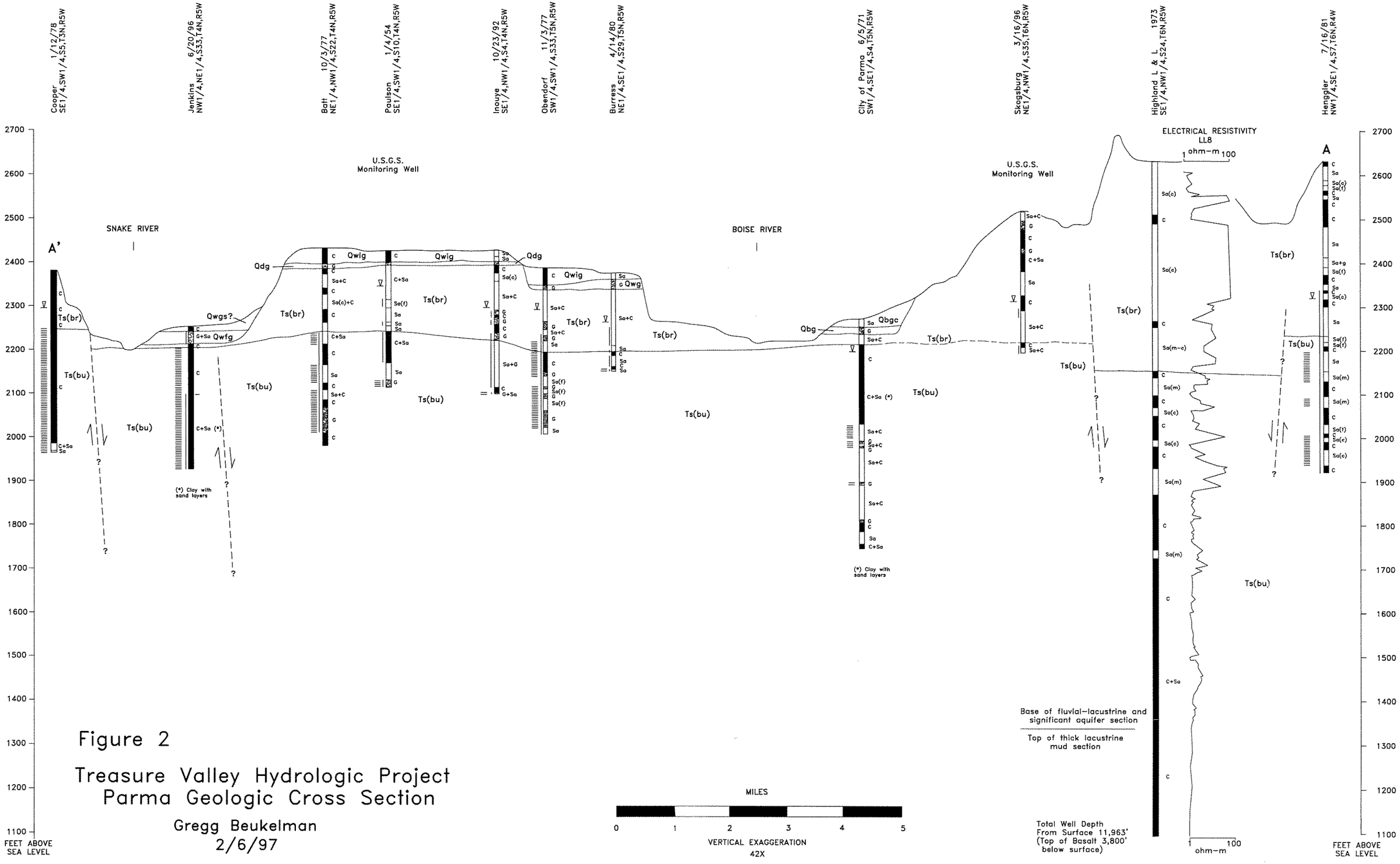


Figure 2

Treasure Valley Hydrologic Project
Parma Geologic Cross Section

Gregg Beukelman
2/6/97

Cross section of the Treasure Valley in the Notus area for the TVHP (Treasure Valley Hydrologic Project):
Notes on Geology of the Notus area, Gem, Payette, Canyon and Owyhee Counties, Idaho

by Gregg Beukelman
Department of Geosciences, Boise State University
Boise, Idaho 83725
tele: 208-385-1631, fax 385-4061, email: gbeukelm@trex.idbsu.edu

February 18, 1997

Introduction

The report and enclosed data are a preliminary compilation of information along a transect extending NE-SW from the Emmett Valley, southwest near the town of Notus and to the south of the Snake River (Fig. 1). The intent of this report is to show the nature of the Late Cenozoic stratified sediments in the upper portion of the western Snake River Plain (Fig. 2). Included for each well along the transect are the well owner, Land Office Grid coordinates, surface elevation (± 10 feet), and diagrams of well construction and lithology (attached). Lithologies, taken from well drillers' reports on record at the Idaho Department of Water Resources and the Boise office of the U. S. Geological Survey, are plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers' reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area Fig. 1) is included showing the route of the transect (A-A'), individual well owners and surface geology (taken from Othberg and Stanford, 1992).

Methods

The cross section included is a graphical presentation of subsurface lithologies based on water well drillers reports. Wells along a NE-SW transect were selected to ensure maximum section coverage and U. S. Geological Survey monitoring wells were included where possible. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (see attached sheets). Correlations were made at this scale and all data digitized and reduced to produce the cross section in figure 2. Accuracy of all elevations is probably ± 10 feet. Elevations of the contacts at the top of the lacustrine claystone are interpreted from lithologic and electrical resistivity logs for the Oroco Oil Company Richardson #1 and Sundance Oil Company Caldwell Hunter Linning #1-30 deep exploration wells. The elevations for the top of the basement Miocene basalt are taken from a structural contour map of this contact (Wood, 1997).

Structure

The structural nature of this area of the plain is inferred to be a normal fault-bounded graben. Faults are thought to be older structures owing to their lack of surface expression and the absence of offset in Pleistocene gravels and overlying Bonneville Flood deposits. Evidence for a major north facing fault south of the Snake River is the rather monotonous thickness of clay seen in the Lineberger well. Nearby sediments having a similar appearance are mapped by Ekren and others (1981) as Miocene Poison Creek Formation. Thick clay units are not seen as similar elevations in the Asumendi well just across the river to the north suggesting a minimum offset of 400 feet. North of the Snake River, evidence suggests the presence of a five mile wide upthrown block (horst) based in elevations of the clay dominant section. This structure, as identified in the upper stratigraphy of the basin, correlates with a topographic high on the surface of the basement basalt (Wood, 1997). Several other normal faults, all having offsets less than 120 feet, are interpreted based on offset of a very distinctive color boundary between overlying brown sediments and underlying blue sediments. A south facing fault just north of the Lane well correlates spatially with a fault seen in the Miocene basalts but in the sediments appears to have an opposite sense of displacement. The north facing normal fault just north of the Gottesch well and along the southern margin of the Emmett Valley correlates well with the northwest extension of a similarly facing basement fault (Wood, 1997). Based on the sediment color change boundary, the section appears to have no discernable dip along the NE-SW oriented line of section (0.04° between the Frisby and Gottesch wells).

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits and an interbedded basalt unit overlying a basement of basalt that varies in elevation along the profile from -2000-ft to -3200-ft (Minus signs indicate elevation below sea level). Surficial deposits include modern flood plain deposits, Bonneville Flood slack water fine sediments, gravels of Pleistocene age, and older Tertiary age sediments. Low lying portions of the profile adjacent to the Boise and Snake River courses are mantled by sediments of Bonneville Flood slack water origin. There are typically silts and clays and commonly overlie terrace gravels including from youngest to oldest: Gravel of Boise Terrace, Gravel of Whitney Terrace, Gravel of the Wilder Terrace, and Gravel of Deer Flat Terrace. In the Emmett Valley a valley bottom gravel may be a modern alluvial deposit (Qal) of the Payette River or part of a older terrace with correlation to the Boise Terrace. A thin (approximately 10 feet) perched gravel occurring in the Gottesch well at 2390-ft elevation may also be a remnant of a Pleistocene terrace.

Beneath the surficial sediments is a complex sequence of interfingering lenses of gravels, sands, and clays which are interpreted to represent fluvial and shallow lacustrine deposits. This section contains an upper portion in which sediments are commonly some shade of brown, tan, or yellow and a deeper portion having sediments that are described as blue in drillers logs. The boundary between these color-defined units occurs at 2250-ft ± 75 ft elevation and appears in most well logs. The brown-colored unit is up to 300 feet thick beneath the uplands north and south of the Boise River, but has apparently been mostly removed by erosion by the Boise River Valley beneath the lowlands. The nature of this type of boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are

thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. Alternatively, it is also possible that recharge by oxygenated waters percolating through reduced (blue) iron minerals may oxidize formerly blue-gray colored deposits. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. Evidence in the area of the transect, such as the uniform elevation of the contact and its lack of any identifiable deflection near either the Boise River or Snake River (areas which might be thought to be recharge sources), suggests that this brown-blue contact is the result of original diagenesis and not greatly affected by later recharge. Therefore, this oxidation/reduction contact may well be useful for geologic interpretation of depositional environments.

North of the major fault in the Snake River area, the deeper part of the sedimentary section is composed of about 2800 feet of lacustrine claystone. The upper contact of this section is at 620-ft or 815-ft elevations as interpreted from the electrical resistivity logs of the Richardson #1 and Caldwell Hunter Linning #1-30 deep exploration wells respectively. The geometry of the upper contact of this claystone cannot be determined from this cross section as only the deep exploration wells penetrate it. Included within the claystone section is an approximately 400 foot thick volcanic unit of interbedded basaltic flows and tuffs. This basalt can be seen on seismic reflection data (Lariat Exploration-BB2 line) and in the Caldwell Hunter Sinning #1-30 well where its top is penetrated at -1000-ft elevation. The claystone section is overlain by a fluvial-lacustrine section containing a significant aquifer section a minimum of 900 feet thick. Beneath the uplands north of the Snake River the base of this section, containing sand aquifers, is the top of the pro-delta mudstone facies interpreted by Wood (1997).

Basalt forms a volcanic basement to the sedimentary section. Although no wells along the transect penetrates the top of the basalt, seismic reflection data from the Lariat Exploration-BB2 line suggest that its upper contact is at about -2400-ft elevation in the area of the Pioneer Irrigation well. Elsewhere along the profile, the topography of the upper contact of the basalt, as interpreted by Wood (1997) from seismic reflection data, mimics the graben form of the basin with the exception of the topographic high between the Snake River and the Boise River. Elevations of the basalt surface range from -2000-ft near the southern end of the cross section to about -3200-ft farther to the northeast.

Hydrogeology

With two exceptions, the static water level in wells along this transect vary only 130 feet in elevation. One exception is the Asumendi well located adjacent to the Snake River having a static water level of 2190-ft and the other is the Hillard well in the highlands between the Boise River drainage and the Payette River drainage that has a water level of 2580-ft. The Woods well in the Emmett Valley was completed into a thick section of clay to an elevation of 1940-ft and is flowing artesian. Most of the wells between the Emmett Valley and the Boise River are completed in the alluvial, fluvial, and shallow lacustrine section and behave as unconfined of semiconfined. Between the Boise River flood plain and the Snake River the static water level is

rather consistent, ranging from 2390-ft to 2340-ft elevation with a trend of decreasing elevation nearer both water courses. Only one well south of the Snake River is included in the transect so no trend south of the river has been studied, but the one water level is about 125 feet lower than the others north of the river.

Five wells included in the cross section are part of the U. S. Geological Survey monitoring well program:

The Pioneer Irrigation well (SE1/4, NW1/4, S22, T4N, R4W) has a static water level of 2340-ft as measured on 9/19/96. The well is cased for the upper 65 feet if its total 132 foot depth making it likely that water is from a sand at 2220-ft elevation. This sand unit is behaves as a semiconfined aquifer.

The Clement well (SW1/4, NW1/4, S36, T5N, R4W) has a water level of 2340-ft as measured on 3/21/96 and the upper 125 feet of its total 146 foot depth is cased. A sand unit at 2228-ft is the likely source of the water and is acting as a semiconfined aquifer.

The Copp well located in the NE1/4, NW1/4, S24, T5N, R4W is completed to a depth of 448 feet in the upper alluvial, fluvial, and lacustine sediments. Its static water level is at 2373-ft elevation and is cased a total of 420 feet with screened intervals that allow sand lenses to supply water.

The Hanson Livestock Co. well (NW1/4, NE1/4, S16, T5N, R4W) is completed to a depth of 333 feet and is cased its entire depth. Perforations in the bottom 70 feet and a gravel pack likely allow for supply of water by a higher unit (2250-ft) which behaves as an unconfined aquifer.

The Lane well (NE1/4, SW1/4, S35, T6N, R4W) penetrates the upper section of alluvial, fluvial, and lacustrine deposits to a depth of 362 feet. The sediments in the lowest 70 feet of the borehole are all water bearing but the well is cased its entire depth making it likely that the sand unit at 2265-ft elevation is the primary water source.

References

Idaho Department of Transportation, 1994, 30 X 60 minute series topographic map of Boise, Idaho, scale 1:100,000.

Idaho Department of Water Resources, 1997 microfiche file of drillers reports, Orchard Street Office.

Othberg, K.L., and Sanford, L.R., 1992, Geologic map of the Boise Valley and adjoining area, western Snake River Plain, Idaho: Idaho Geological Survey, Geologic Map Series, scale 1:100,000.

Ekren, E.B., McIntyre, D.H., and Bennett, E.H., 1981, Geologic map of Owyhee County, Idaho, west of Longitude 116° W: U.S. Geological Survey Miscellaneous Investigations Map I-1256, scale 1:125,000.

U.S. Geological Survey, 1990, Files on wells in observation network, Collins Road Office.

Wood, S.H., 1997, Structural contour map of the top of Miocene basalt basement rocks, western Snake River Plain, Idaho: Report for Idaho Department of Water Resources (2 sheets, 1:100,000).

Figures and enclosures

Figure 1 Map (1:100,000) showing cross section transect, wells used in cross section, surficial geology, location of deep exploration wells, and seismic reflection line.

Figure 2a & b Cross section of geology and hydrogeology across the western Snake River Plain in the Notus, Idaho area.

Figure 2a Legend for cross section

Attached Eleven panels of wells used in cross section showing lithology and well construction.

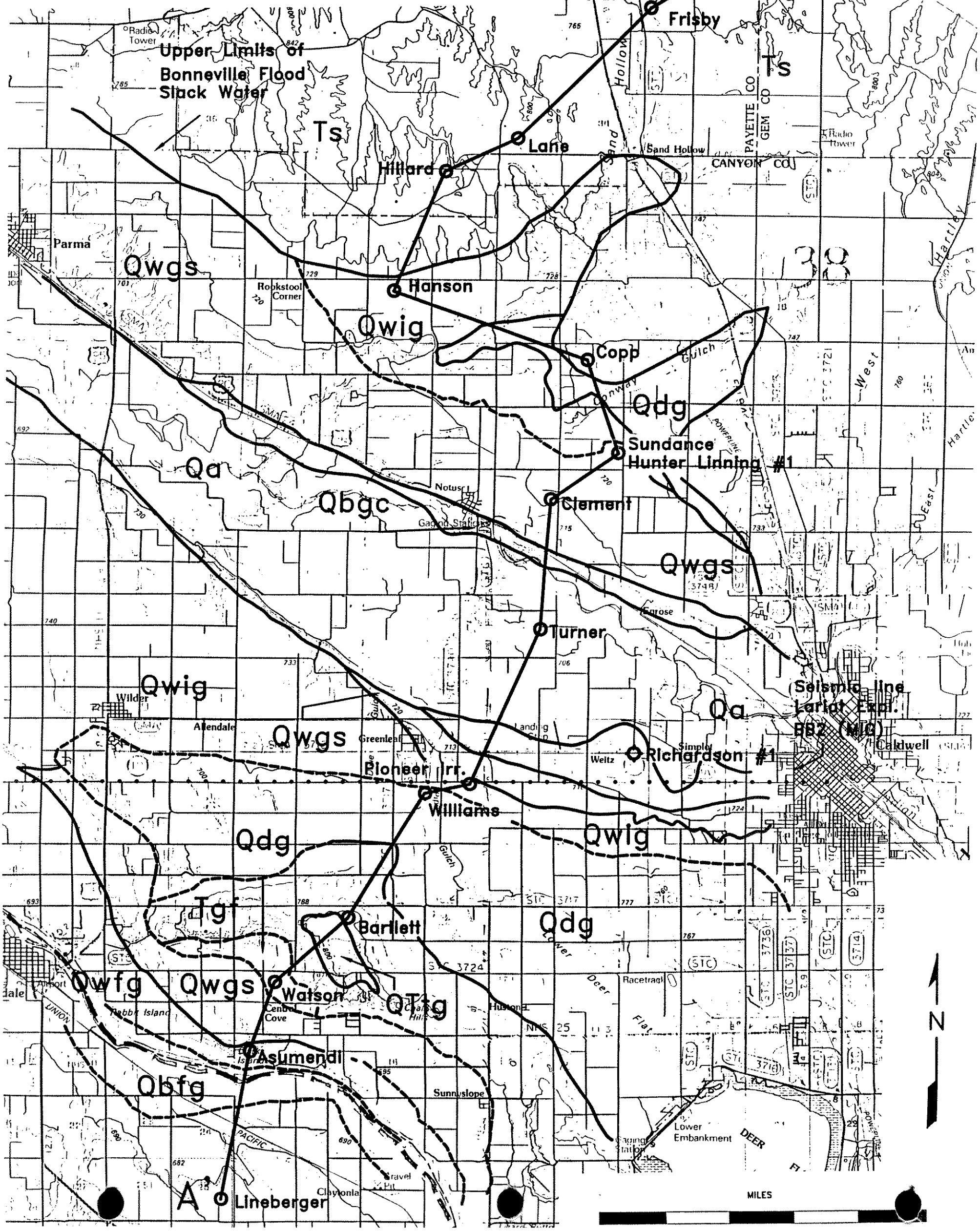
Attached Drillers reports of selected wells.

FIGURE 1

NOTUS CROSS SECTION LOCATION MAP

Surficial geology from Geologic Map of the Boise Valley and Adjoining Area, Western Snake River Plain, Idaho (Othberg, K.L., Stanford, L.R., 1992)

Qa	Alluvium of Boise and Snake River
Qbgc	Clay of Bonneville Flood slack water
Qbfg	Gravel of Bonneville Flood scoured Boise Terrace
Qwgs	Sandy silt of Bonneville Flood slack water
Qwfg	Gravel of the Bonneville Flood scoured Whitney Terrace
Qwig	Sandy silt of the Bonneville Flood slack water
Qdg	Gravel of the Deer Flat Terrace
QTtg	Tenmile Gravel
Tgf	Glenns Ferry Formation
Ts	Sand and Mudstone of stream and lake sediment



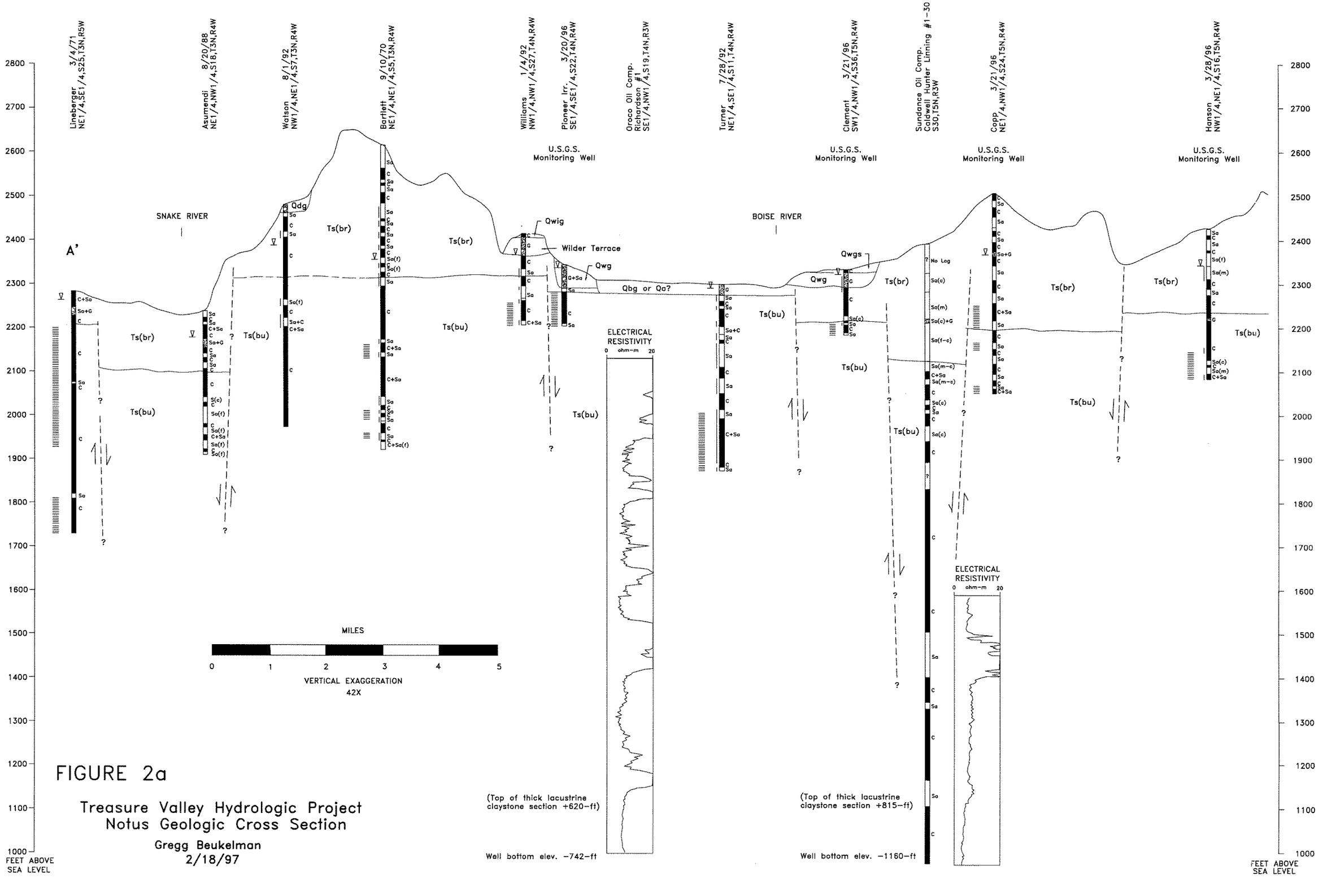
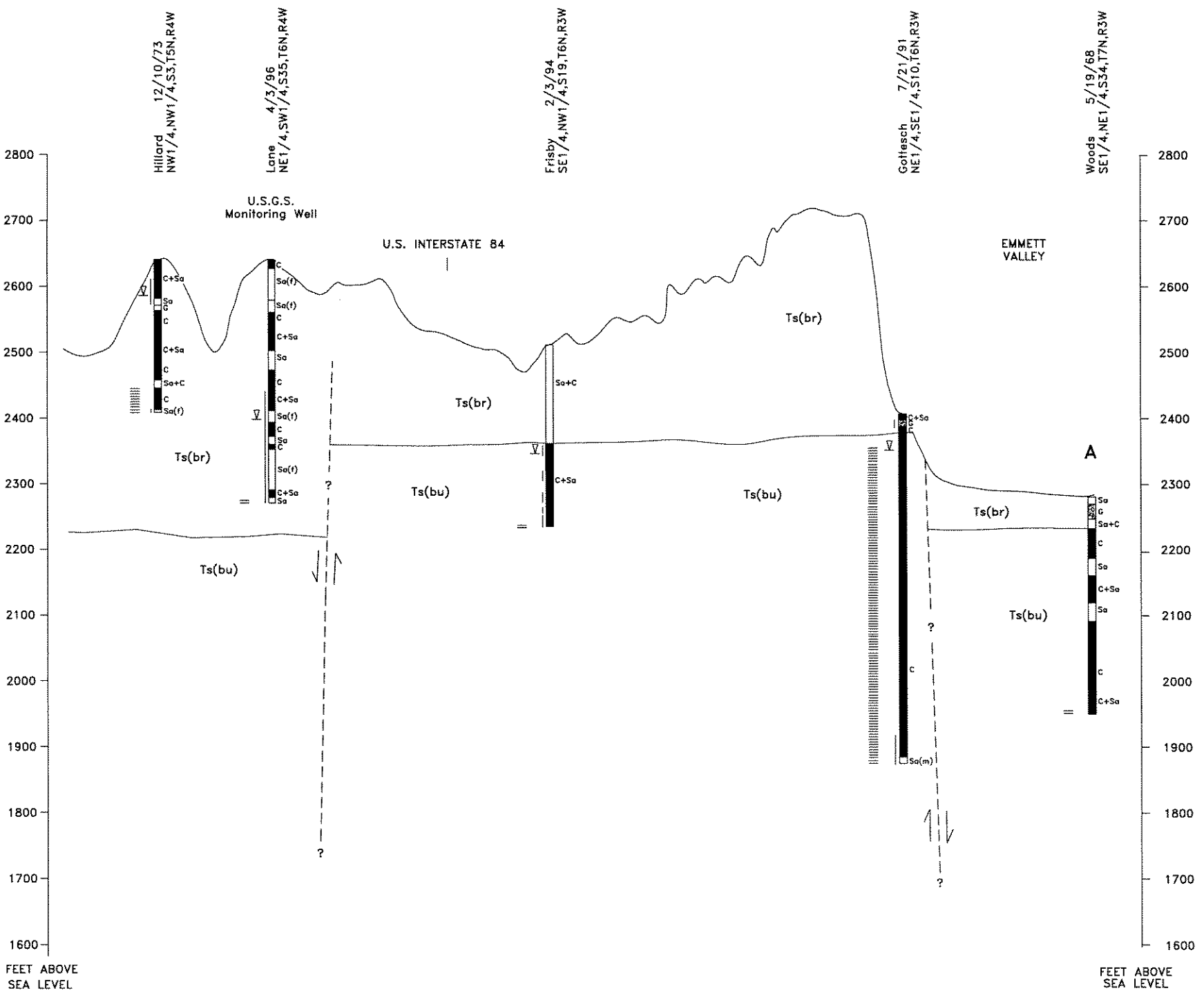


FIGURE 2a

Treasure Valley Hydrologic Project
Notus Geologic Cross Section

Gregg Beukelman
2/18/97



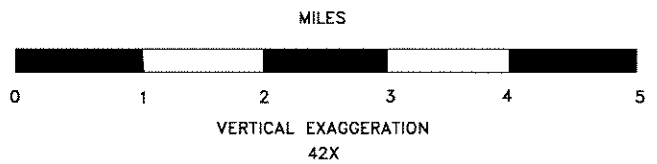


FIGURE 2b

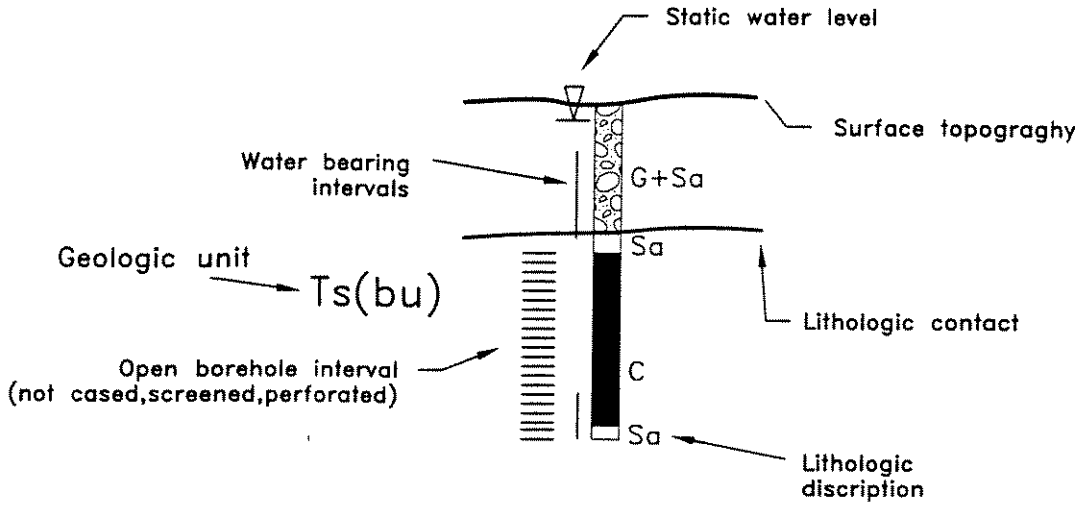
Treasure Valley Hydrologic Project
Notus Geologic Cross Section

Gregg Beukelman
2/18/97

FIGURE 2C

CROSS SECTION LEGEND

Diagram of Typical Well Interval



GEOLOGIC Units (After Othberg and Stanford, 1992)

Qa	Alluvium of Boise and Snake River
Qas	Sandy alluvium of side-stream valleys
Qbgc	Clay of Bonneville Flood slack water
Qwgs	Sandy silt of Bonneville Flood slack water
Qwfg	Gravel of the Bonneville Flood scoured Whitney Terrace
Qwig	Sandy silt of the Bonneville Flood slack water
Qbg	Gravel of the Boise Terrace
Qwg	Gravel of the Whitney Terrace
Tdg	Gravel of the Deer Flat Terrace
Ts	Sand and Mudstone of stream and lake sediment

WELL LITHOLOGIC ABBREVIATIONS

G	Gravel
Sa(c,m,f)	Sand (coarse, medium, fine)
C	Clay

When two sediment sizes are combined (C+Sa) the first sediment is the most abundant.

Color modifiers: Brown (Br) and Blue (Bu) are included for Tertiary sediments

USE TYPEWRITER OR BALL POINT PEN

State o .daho
Department of Water Resources

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER (Cooper)

Name BOISE CASCADE

Address RUPERT IDAHO

Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)

☐ Municipal ☐ Industrial ☒ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 405 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.250 inches	6 inches	+ 1 feet	131 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☒ Yes ☐ No

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name _____

Type _____ Model No. _____

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____

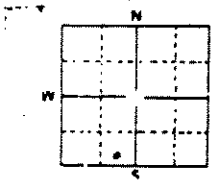
Placed from _____ feet to _____ feet

Surface seal depth 18 Material used in seal ☐ Cement grout ☒ Puddling clay ☐ Well cuttings

Sealing procedure used ☐ Slurry pit ☐ Temporary surface casing ☒ Overbore to seal depth

6. LOCATION OF WELL 57

Sketch map location must agree with written location.



Subdivision Name _____

Lot No. _____ Block No. _____

County OWYHEE

SE ¼ SW ¼ Sec. 5 T. 3 N/S R. 5 E/W

7. WATER LEVEL

Static water level 50 feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow

Temperature ___ F. Quality 176 RS, 600

Artesian closed-in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☒ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
12	60	2

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
6	0	65	HARD BROWN CLAY		✓
	65	115	STICKY BROWN CLAY		✓
	115	128	BROWN CLAY & GRAVEL	✓	
	128	390	BLUE CLAY		✓
	390	405	SANDY BLUE CLAY	✓	
	405		BLACK SAND	✓	

10.

Work started JULY-4-78 finished JAN-12-78

11. DRILLERS CERTIFICATION

Firm Name Kelly Hatten Well Drlg Firm No. 93

Address RT-1 RUPERT IDAHO Date 1-18-78

Signed by (Firm Official) Kenneth M. Hatten

and

(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE COPY TO THE DEPARTMENT

USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE COPY TO THE DEPARTMENT

DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

G-442

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Fred Batt (Wilder Hop Co.)

Address Rt. 1, Wilder, Idaho 83676

Owner's Permit No. 63-8953

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☐ Other (specify type)

☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☐ Cable ☒ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 28 inches Total depth 444 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.250 inches	16 inches	+ 2 feet	200 feet
.250 inches	16 inches	220 feet	260 feet
.250 inches	16 inches	300 feet	325 feet
.250 inches	16 inches	420 feet	430 feet
____ inches	____ inches	____ feet	____ feet

Was casing drive shoe used? ☐ Yes ☒ No

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

Well screen installed? ☒ Yes ☐ No

Manufacturer's name Roscoe Moss Model No. ____

Type ____

Diameter 16 Slot size 80 Set from 200 feet to 220 feet

Diameter 16 Slot size 80 Set from 260 feet to 300 feet

Diameter 16 Slot size 80 Set from 325 feet to 420 feet

Gravel packed? ☒ Yes ☐ No Size of gravel 3/8 minus

Placed from 30 feet to 444 feet

Surface seal depth 30' Material used in seal: ☐ Cement grout ☐ Well cuttings ☒ Puddling clay

Sealing procedure used: ☐ Slurry pit ☐ Temporary surface casing ☒ Overbore to seal depth

6. LOCATION OF WELL

Sketch map location must agree with written location.

63

N / W / E / S

Subdivision Name ____

Lot No. ____ Block No. ____

County Canyon

NE ¼ NW ¼ Sec. 22 T. 4 N/S, R. 5 E/W

7. WATER LEVEL

Static water level ____ feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow ____

Temperature ____ °F. Quality ____

Artesian closed-in pressure ____ p.s.i.

Controlled by: ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Drawdown	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
28	0	10	Topsoil		
	10	39	Hardpan		
	39	50	Sand, Gravel, Rock		
	50	60	Clay		
	60	64	Sand & Pea Gravel		
	64	79	Fine Sand		
	79	99	Sand & Clay Mixed		
	99	105	Clay		
	105	117	Sand & Pea Gravel w/some Clay		
	117	120	Clay		
	120	124	Sand & Pea Gravel		
	124	140	Sand, Small Gravel & Clay mixed		
	140	169	Clay		
	169	189	Sand & Pea Gravel w/some Clay		
	189	202	Blue Clay w/ some Sand		
	202	214	Blue Sand & Pea Gravel		
	214	261	Gray Clay w/some Sand		
	261	294	Fine to Med. Blue Sand		
	294	301	Coarse Sand & Pea Gravel		
	301	320	Clay		
	320	331	Sand & Clay mixed		
	331	338	Fine to Coarse Sand & Pea Gravel		
	338	358	Clay w/some Sand		
	358	419	Coarse Sand & Small Gravel		
	419	434	Clay		
	434	444	Clay & Shale		

10.

Work started 9-27-77 finished 10-3-77

11. DRILLERS CERTIFICATION

Firm Name Pete Cope Drilling Co. Inc. Firm No. 213

Address 10566 K-Bar-T Drive Boise, Idaho 83705 Date 10-12-77

Signed by (Firm Official) [signature]

and

(Operator) [signature]

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

G-423

Form 238-7
3/96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
Use Typewriter or Ballpoint Pen

Office Use Only
Inspected by _____
Twp____ Rge____ Sec____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 63-96-W-0394-000
Other IDWR No. _____

2. OWNER:
Name Ralph Tenkara
Address 26757 Upper Pleasant Rd
City Wilder State IDAHO Zip 83676

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

Twp. 4 North ☒ or South ☐
Rge. 5 East ☐ or West ☒
Sec. 33 1/4 NW 1/4 NE 1/4
Gov't Lot ____ County Canyon
Lat: : Long: :
Address of Well Site 26757 Upper Pleasant Rd City Wilder
(Give at least name of road + Distance to Road or Landmark)
Lot ____ Blk. ____ Sub. Name _____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	18'	400	Pour

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 58'
Was drive shoe seal tested? ☒ Y ☐ N How? Air

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	58	250	Steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
☐ Perforations Method _____
☐ Screens Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
20 ft. below ground Artesian pressure ____ lb.
Depth flow encountered 150-320 ft. Describe access port or control devices: CAP

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
80	300	300	1 Hr

Water Temp. 60 Bottom hole temp. 60
Water Quality test or comments: _____
Depth first Water Encountered 18

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	2	Top Soil		
	2	4	Hard Pan		
	4	10	Sandy Clay		
	10	18	Sand & Gravel	X	
6	18	34	" " Little	X	
	34	42	Red Clay		
	42	150	Blue Shale		
	150	320	Blue Shale & Sheet Lyers Sand Stone	X	
			@ 200 ft. 15 Gal min		
			@ 320 ft. 80 " "		
			RECEIVED		
			JUL 0 8 1996		
			Department of Water Resources		
			RECEIVED		
			JUL 0 1 1996		
			WATER RESOURCES WESTERN REGION		

Completed Depth 320 (Measurable)
Date: Started 6-19-96 Completed 6-20-96

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Treasure Valley Drilling Firm No. 750
Firm Official [signature] Date 6-20-96
and
Supervisor or Operator [signature] Date 6-20-96
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Bill Paulson
Wilder

9-185
(October 1950)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

site ID# 434128116551601

WELL SCHEDULE

Date July 30, 1953. Field No. 4N 5W

Record by R.C.S. & FEF 1-4-54 Office No. 10cd1d

Source of data Driller's log, Obs., Owner

1. *Location:* State Idaho County Canyon

Map State Highway Dept

SE ¼ SW ¼ sec. 10 T 4 N R 5 W

2. *Owner:* Bill Paulson Address

Tenant Address

Driller A.E. Hasbrook & Son Address Nampa

3. *Topography* Level Terrain

4. *Elevation* ft. above / below

5. *Type:* Dug, drilled, driven, bored, jetted Rot.

6. *Depth:* Rept. 306 ft. Meas. 11/4/28

7. *Casing:* Diam. 4" in. Type

Depth 303 ft. Finish 5" perf

8. *Chief Aquifer* From ft. to ft.

Others

9. *Water level* 45.3 ft. rept. meas. 1-4 1954 above / below top of casing which is 3.7 ft. above / below surface

10. *Pump:* Type Jet Capacity G. M.

Power: Kind E Horsepower ½

11. *Yield:* Flow G. M., Pump 600 G. M., Meas., Rept., Est.

Drawdown ft. after hours pumping G. M.

12. *Use:* Dom., Stock, PS., RR., Ind., Irr., Obs.

Adequacy, permanence O.K.

13. *Quality* Soft

Temp °F.

Taste, odor, color Sulfur O for 1-11-80 Potable Yes / No

Unfit for

14. *Remarks:* (Log, Analyses, etc.)

SCRANTON SITE/SCHEDULE NO. 10cd1d DELETED DATE 6-5-84

SITE SCHEDULE MADE 11-W-6

SITE DATA UPDATED/STORED

GWSI DATE 08-28-83 WJM

1032

U. S. GOVERNMENT PRINTING OFFICE 16—62891-1

66635

FORM B-1

LOG OF WELL
(FOR FIELD COPIES OF DRILLERS LOGS)

STATE County Number 4N 5W-10cdd1

LOCATION ¼ ¼ SEC. , T. R.

DRILLER A.E. Hasbrook & Son ADDRESS

SOURCE OF DATA Drillers log
Rec 7-30-53

(APPEND CASING RECORD AND ADDITIONAL DATA ON NOTE SHEET)

DRILLER'S DESCRIPTION	THICKNESS	DEPTH
Soil & clay, gray	25	25
Gravel	6	31
Clay, gray sandy	77	108
Sand, fine muddy & water	17	125
Sand, muddy	35	160
Sand, runny & water	5	165
Sand, muddy	15	180
Shale, blue sandy; sand & water at base	5	185
Shale, blue silty and sand & water	23	208
Shale & sand, fine; running at base	42	250
Sand, fine muddy	39	289
Gravel & sand	3	292
Gravel & sand, water	8	300
Sand, coarse, and gravel	6	306

PAGE 2 OF 2 PAGES

Form 238-7
4/92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

RW G-459

1. WELL OWNER
Name Kris Inouye
Address 23605 Rodeo Ln, Parma, ID 83660
Drilling Permit No. 63-92-W-0928-000
Water Right Permit No.

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE
☒ Domestic ☐ Irrigation ☐ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED
☒ Rotary ☒ Air ☐ Auger ☐ Reverse rotary
☐ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION
Casing schedule: ☒ Steel ☐ Concrete ☐ Other

Thickness	Diameter	From	To
.250 inches	8 inches	+ 1 feet	325 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

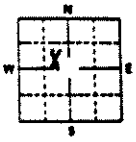
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? _____ inches by _____ inches

Number		From	To
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer _____ Type _____
Top Packer or Headpipe _____
Bottom of Tailpipe _____

Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 35 Material used in seal: ☐ Cement grout ☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port Sanitary well cap

6. LOCATION OF WELL
Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Canyon
Address of Well Site Same as above
(give at least name of road)
SE ¼ NW ¼ Sec. 4, T. 4 N ☒ or S ☐, R. 5 E ☐ or W ☒

7. WATER LEVEL
Static water level 126 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature _____ °F. Quality _____
Describe artesian or temperature zones below.

8. WELL TEST DATA
☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
145	175	4

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
12"	0	6	Top soil		X
12"	6	16	Sandstone		X
12"	16	34	Sand & gravel		X
12"	34	36	Brown clay		X
8"	36	54	Brown clay		X
8"	54	71	Coarse brown sand, sm gravel		X
"	71	78	Brown clay		X
"	78	87	Brown sand, pea gravel		X
"	87	103	Brown clay		X
"	103	108	Brown sand		X
"	108	116	Brown clay		X
"	116	123	Coarse sand		X
"	123	137	Brown clay		X
"	137	150	Brown sand, pea gravel	X	
"	150	154	Brown clay		X
"	154	171	Brown sand, pea gravel	X	
"	171	178	Brown clay		X
"	178	183	Brown sand, pea gravel	X	
"	183	187	Brown clay		X
"	187	194	Brown Sand, pea gravel	X	
"	194	206	Brown sand, pea gravel	X	
"	206	207	Blue shale		X
"	207	220	Black sand, pea gravel	X	
"	220	308	Black sand, pea gravel	X	
"	308	317	Gray clay		X
"	317	325	Black sand, pea gravel	X	

RECEIVED
NOV 30 1992
Department of Water Resources
Western Regional Office

RECEIVED
NOV 27 1992

Work started 10/20/92 finished 10/23/92

10. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Firm Name Riverside Drilling Firm No. 333
Address PO Box 720 Parma, ID 83660 Date 11/23/92
Signed by Drilling Supervisor Jay Laughlin
and
(Operator) Dale Ross
(If different than the Drilling Supervisor)

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

G-387

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

RECEIVED
NOV 17 1977
Department of Water Resources

USE TYPEWRITER OR BALLPOINT PEN

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Ray Obendorf

Address Rt. 1, Parma, Idaho 83660

Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☐ Other (specify type)

☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☐ Cable ☒ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 28 inches Total depth 375 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.270 inches	16 inches	+ 2 feet	155 feet
.270 inches	16 inches	245 feet	265 feet
.270 inches	16 inches	355 feet	375 feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Was casing drive shoe used? ☐ Yes ☒ No

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number		From	To
____	perforations	____ feet	____ feet
____	perforations	____ feet	____ feet
____	perforations	____ feet	____ feet

Well screen installed? ☒ Yes ☐ No

Manufacturer's name Roscoe Moss

Type _____ Model No. _____

Diameter 16 Slot size 80 Set from 155 feet to 245 feet

Diameter 16 Slot size 80 Set from 265 feet to 355 feet

Gravel packed? ☒ Yes ☐ No Size of gravel _____

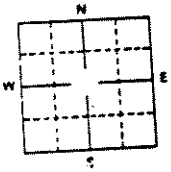
Placed from 35 feet to 375 feet

Surface seal depth 35' Material used in seal: ☐ Cement grout ☒ Puddling clay ☐ Well cuttings

Sealing procedure used: ☐ Slurry pit ☐ Temporary surface casing ☒ Overbore to seal depth

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____

Lot No. ____ Block No. ____

County Canyon

¼ ¼ Sec. 33, T. 5N N/S, R. 5W E/W

7. WATER LEVEL

Static water level 93 feet below land surface.

Flowing? ☐ Yes ☐ No G.P.M. flow _____

Temperature ____ °F. Quality _____

Artesian closed-in pressure ____ p.s.i.

Controlled by: ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Drawdown	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
28	0	15	Topsoil, Hardpan, Clay		
	15	25	Brn. Clay, some Hardpan & Gravel		
	25	41	Brn. Clay		
	41	48	Sand & Gravel		
	48	52	Brn. Clay		
	52	87	Fine Brn. Sand		
	87	99	Brn. Clay w/some Sand		
	99	104	Brn. Clay		
	104	122	Fine to Coarse Brn. Sand		
	122	140	Gravel w/some Clay		
	140	149	Fine Sand		
	149	152	Brn. Clay w/Gravel		
	152	165	Gravel		
	165	184	Fine to Coarse Sand		
	184	191	Brn. Clay w/Fine Sand		
	191	202	Blue Clay w/some Sand & Gravel		
	202	215	Blue Sand w/some Clay		
	215	219	Coarse Sand & Gravel		
	219	222	Pea Gravel		
	222	233	Sand & Gravel w/some Clay		
	233	237	Gravel		
	237	242	Pea Gravel		
	242	265	Fine Sand w/traces of Gravel		
	265	273	Gravel		
	273	282	Fine Sand w/some Gravel		
	282	293	Gravel		
	293	301	Coarse Sand & Gravel		
	301	309	Gravel		
	309	320	Fine Sand		
	320	342	Gravel		
	342	362	Gravel w/some Sand & Gravel		
	362	374	Fine to Med. Blue Sand		
	374	375	Sandstone		

10. Work started 10-11-77 finished 11-3-77

11. DRILLERS CERTIFICATION

Firm Name Pete Cope Drilling Co. Inc. Firm No. 213

Address 10566 K-Bar-T Drive Boise, Idaho 83705 Date 11-4-77

Signed by (Firm Official) _____

and

(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

WELL DRILLER'S REPORT

G-390

BALL POINT PEN

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER
Name: Bill Burgess
Address: RT 2 Nampa Idaho 83651
Owner's Permit No.:

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE
☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal ☐ Injection
☐ Other (specify type)

4. METHOD DRILLED
☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other

5. WELL CONSTRUCTION
Casing schedule: ☐ Steel ☐ Concrete ☐ Other
Thickness / Diameter
12.50 inches ___ inches ___ feet to ___ feet
___ inches ___ inches ___ feet to ___ feet
___ inches ___ inches ___ feet to ___ feet
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☒ ☐ Yes ☒ No
How perforated? ☒ ☐ Factory ☐ Knife
Size of perforation ___ inches by ___ inches
___ perforations
___ perforations
___ perforations
Well screen installed? ☐ Yes ☒ No
Manufacturer's name
Type ___ Model No.
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel
Placed from ___ feet to ___ feet
Surface seal depth 21 Material used in seal ☐ Cement grout
☒ Puddling clay ☐ Well cuttings
Sealing procedure used ☐ Slurry pit ☐ Other
☐ Overburn to seal off
Method of joining casing: ☐ Threaded ☐ Welded ☐ Solvent
☐ Cemented between strata
Describe access port

6. LOCATION OF WELL
Sketch map location must agree with written location
N / W / E / S
Subdivision Name
Lot No. ___ Block No. ___
County Canyon 30 acre Apple North of small tract SE corner
NE ¼ SE ¼ Sec. 29 T. 5 N. R. 5 E.W.M.

7. WATER LEVEL
Static water level 109 feet below land surface.
Flowing ☐ Yes ☒ No G.P.M. flow
If flow is closed in pressure
Controlled by ☐ Valve ☐ Cap ☐ Plug
Temperature 58 Quality 26 grains hard 9/18

8. WELL TEST DATA
☐ Pump ☐ Bailer ☒ Air ☐ Other
Discharge G.P.M. | Pumping Level | Hours Pumped
40 | Est 135 | 8

9. LITHOLOGIC LOG
Hole Diam. | Depth From | Depth To | Material | Water Yes | Water No
0 | 10 | | Soil | | X
10 | 85 | | Brown sandy gravel | | X
85 | 94 | | Brown sand & gravel | | X
94 | 125 | | Brown sand | | X
125 | 164 | | Brown sand | X |
164 | 174 | | Brown clay | | X
124 | 177 | | Brown sand | | X
177 | 185 | | Brown clay | | X
185 | 210 | | Brown sand | X |
210 | 226 | | Brown sticky clay | | X
226 | 228 | | Brown sand & gravel | X |

10.
Work started 5 Apr 80 Completed 14 Apr 80

11. DRILLER'S CERTIFICATION
We certify that all minimum well construction standards were complied with at the time this rig was removed.
Firm Name A-1 Rotary Well Drilling Firm No. 241
Address Box 2 Nampa Idaho Date 17 Apr 80
Signed by (Firm Official) [signature]
(Operator) [signature]

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Department of Water Resources

63-206

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCE

WELL DRILLER'S REPO

Statute requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

17. WATER LEVEL

2. NATURE OF WORK

18. WELL TEST DATA

Discharge G.P.M.	Pumping Level	Hours Pumped
40		2

3. PROPOSED USE

19. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
16"	0'	4'	Topsoil		X
16"	0'	18'	Sand-clay binder		X
8"	18'	40'	Sand & gravel		X
8"	40'	80'	Sandy clay		X
8"	80'	90'	Clay-gravel		X
8"	90'	106'	Sandy clay		X
8"	106'	115'	Hard clay		X
8"	115'	133'	Sand & clay layers		X
8"	133'	158'	Sand & clay layers		X
8"	158'	187'	Hard sandstone	No	X
8"	187'	220'	Clay		X
8"	220'	240'	Sand & clay layers		X
8"	240	292'	Sand & clay layers		X
8"	292'	302'	Clay		X
8"	302'	308'	Sand & clay layers		X
8"	308'	322'	Sand		X

4. METHOD DRILLED

5. WELL CONSTRUCTION

6. LOCATION OF WELL 63

Sketch map location must agree with written location.

Subdivision Name

Lot No. Block No.

County Canyon

1/4 SW 1/4 Sec. 35 T. 4 N R. 5 E/W

7. Work started 4/5/78 **Completed** 4/14/78

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name BILL DOTY WELL DRILLING No. 42

Address Rt 7 Caldwell Date 4/27/78

Signed by (Firm Official) Bill Doty

and (Operator) Ted Berg

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

30641

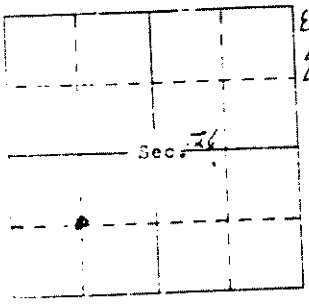
RECEIVED
MAR 31 1967
Department of Reclamation

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name W.B CAFARELLI
Address 2612 CUMBERLAND RD
BOISE IDAHO
Owner's Permit No. 30641
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: IRRIGATION
METHOD OF CONSTRUCTION: Rotary ☒ Cable ☐
Dug ☐ Other ☐ (explain)
CASING SCHEDULE: Threaded — Welded ✓
16 "Diam. from 0 ft. to 400 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: 1/4" Material:
Steel ☒ concrete ☐ wood ☐ other ☐
PERFORATED? Yes ☒ No ☐ Type of perforator used: MILL CUT (explain)
Size of perforations: 3/16" by 3"
9220 perforations from 100 ft. to 390 ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☒
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.
CONSTRUCTION: Well gravel packed? Yes ☒ No. size of gravel 3/4 MINUS Gravel placed from 0 ft. to 400 ft. Surface seal provided? Yes ☒ No ☐ To what depth? 10 ft. Material used in seal: 10' 24" CASING
Did any strata contain unusable water? Yes ☐
No. ☒ Type of water:
Depth of strata ft. Method of sealing strata off:
Surface casing used? Yes ☒ No. ☐
Cemented in place? Yes ☐ No ☒

Locate well in section



Exact Center of the SW 1/4 of Sec. 26 T6N R5W

Boise County
NW 1/4 Sec. 26 T. 6 N/S R. 5 E/W

Size of drilled hole: 24" Total depth of well: 400' Standing water level below ground: 153' Temp. Fahr. 60° Test delivery: 1100 gpm or cfs Pump? ☒ Bail ☐
Size of pump and motor used to make test: 10" Goulds 12" Bowl JOHNS MOTOR
Length of time of test: 2C Hrs. Min.
Drawdown: 200 ft. Artesian pressure: ft. above land surface ☐ Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	4	TOP SOIL	
4	33	CLAY BROWN	
33	39	GRAVEL MED	
39	58	CLAY BR	
58	72	GRAVEL MED	
72	91	CLAY BR	
91	105	GRAVEL MED	
105	120	CLAY BR	
120	140	GRAVEL MED	
140	188	CLAY BR	
188	221	GRAVEL + SAND	✓
221	245	CLAY BR	
245	271	GRAVEL + CLAY	
271	305	CLAY BLUE	
305	318	GRAVEL MED	✓
318	341	CLAY BR	
341	357	SAND	✓
357	381	CLAY BR	
381	392	GRAVEL + SAND	✓
392	400	CLAY BLUE	

Work started: MAR 7 1967
Work finished: MAR 18 1967
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name L. L. McClure
Address: RT 1 Box 157F Payette Idaho
Signed by: L. L. McClure
License No. 393 Date: Mar 29-67

Use other side for additional remarks

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

USE TYPEWRITER OR BALLPOINT PEN

RECEIVED JUL 20 1981
Department of Water Resources
Western Regional Office

1. WELL OWNER

Name Bob Henseleit

Address Rt. #1 -Fruitland, Idaho 83619

Owner's Permit No.

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☒ Reverse rotary
☐ Cable ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other

Thickness	Diameter	From	To
.250 inches	16 inches	+2 410 feet	430 feet
.250 inches	16 inches	470 feet	505 feet
.250 inches	16 inches	525 feet	620 feet
.250 inches	16 inches	680 feet	690 feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

Well screen installed? ☒ Yes ☐ No
Manufacturer's name Roscoe Moss 370 410
Type 16" 30 430 Model No. 470
Diameter 16" Slot size 80 Set from 505 feet to 525 feet
Diameter 16" Slot size 80 Set from 620 feet to 680 feet
Gravel packed? ☒ Yes ☐ No ☐ Size of gravel 3/8 Minus
Placed from -30 feet to 705 feet
Surface seal depth 0-30 Material used in seal: ☐ Cement grout ☒ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld
☐ Cemented between strata
Describe access port 2"

6. LOCATION OF WELL

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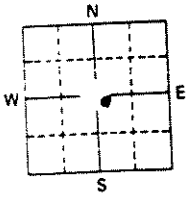
Sketch map location must agree with written location.



Subdivision Name
Lot No. ____ Block No. ____
County
NW ¼ SE ¼ Sec. 7 T. 6 N/S R. 4 E/W.

7. WATER LEVEL

Static water level 0 feet below land surface.
Flowing? ☐ Yes ☐ No G.P.M. flow
Artesian closed-in pressure p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature °F. Quality

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
28"	0	10	Sandy Top Soil, Wht. Clay & Brn. Clay		
	10	15	Brn. Clay		
	15	35	Brn. Sand		
	35	45	Brn. Sand w/Clay Streaks		
	45	55	Brn. Sand - Coarse		
	55	65	Brn. Sand -Getting Finer		
	65	75	Firm Brn. Clay		
	75	85	Brn. Sand		
	85	95	Lt. Brn. Siltstone & Firm Clay		
	95	105	Firm Clay		
	105	115	Brn. Clay - Softer		
	115	145	Clay & Tight Sand - Brn.		
	145	165	Brn. Sand w/ clay streaks		
	165	195	Brn. Clay w/ Sand Streaks		
	195	205	Fine Silty Brn. Sand		
	205	215	Brn. Sand w/Clay Streaks		
	215	235	Silty Brn. Sand		
	235	245	Gray Sand w/Sma. Gravel (Thirsty)		
	245	255	Silty Fine Sand to Medium		
	255	275	Brn. Clay		
	275	290	Gray Sand		
	290	295	Brn. Clay		
	295	309	Lt.Brn. & White Coarse Sand		
	309	325	Brn. Clay		
	325	335	Brn. Sand w/ Clay Streaks		
	335	355	Wht. & Lt.Brn. Sand - Coarse		
	355	390	Lt.Brn.Sand - Medium to Coarse		
	390	395	Fine Sand w/ Clay Streaks		
	395	405	Fine Sand - Getting Coarser		
	405	415	Brn. Sand-Med.To Coarse w/ tr. pea gr.		
	415	425	Blue Clay w/traces of Sand Streaks		
	425	435	Blue to Brn. Sand -Med. to Fine		
	435	471	Brn.Sand - Fine, Medium, Coarse		
	471	495	Blu Clay w/ Silty Sand Strks. at end		
	495	527	Fine to Med. Sand - Traces of Gravel		
	527	535	Dk.Brn.& Blu Clay w/ fine Sand Stks.		

10.

Work started July 7,1981 finished 7-16-81

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name PETE COPE DRILLING CO.INC. Firm No. 213
Address P. O. Box 561 Meridian, ID. 83642 Date July 16,1981
Signed by (Firm Official) Pete Cope
Pete Cope, President
and
(Operator) Jack Jones
Jack Jones

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

USE TYPEWRITER IF POSSIBLE

2 of 2

1. WELL OWNER

Name Bob Hen[illegible]eler

Address Rt, #1 - Fruitland, Id. 83619

Owner's Permit No. _____

2. NATURE OF WORK

☐ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☐ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
_____ inches	_____ inches +	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

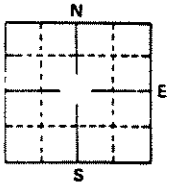
Was casing drive shoe used? ☐ Yes ☐ No
Was a packer or seal used? ☐ Yes ☐ No
Perforated? ☐ Yes ☐ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☐ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ____ Slot size ____ Set from _____ feet to _____ feet
Diameter ____ Slot size ____ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth _____ Material used in seal: ☐ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☐ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County _____
NW ¼ SE ¼ Sec. 7, T. 6 N S, R. 1 E W

7. WATER LEVEL

Static water level _____ feet below land surface.
Flowing? ☐ Yes ☐ No G.P.M. flow
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature ____ °F. Quality _____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
25"	535	555	Fine to Med. Blu Sand w/trcs. Hrd. Clay		
	555	561	Blue Clay		
	561	563	Lt. Blu Sand - Med. to Coarse w/ traces of pea gravel & Clay		
	563	590	Blue Clay		
	590	600	Fine Blue Sand		
	600	605	Blue Clay		
	605	610	Fine to Med. Sand w/Tr. of Gravel		
	610	619	Blue Clay		
	619	630	Coarse Blue Sand		
	630	645	Blu Clay w/ Sand Streaks (Fine to Co.)		
	645	668	** Coarse Blue Sand		
	668	675	Dk. Blu Sand-Getting Finer w/ some Gr.		
	675	682	Lt. Blu Coarse Sand-10% Pea Gravel		
	682	695	Blue Clay		
	695	705	Blue Clay w/Traces of Fine Sand		

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Department of Water Resources
Western Regional Office

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Department of Water Resources

10.

Work started _____ finished 7/16/81

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Cope Firm No. 213
Address _____ Date 7/11/82
Signed by (Firm Official) _____
and
(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Cross section of the Treasure Valley in the Boise area, for the TVHP (Treasure Valley Hydrologic Project):
Notes on Geology of the Boise area, Ada County, Idaho

by Gregg Beukelman
Department of Geosciences, Boise State University
Boise, Idaho 83725
tele: 208-385-1631, fax 385-4061, E-mail: gbeukelm@trex.idbsu.edu

June 31, 1997

Introduction

The report and enclosed data are a preliminary compilation of information along a transect extending NNE-SSW from Boise to south of the Snake River in the Swan Falls Dam area (Fig. 1). The intent of this report is to show the nature of the Late Cenozoic stratified sediments in the upper portion of the western Snake River Plain (Fig. 2). Included for each well along the transect are the well owner, Land Office Grid coordinates, date of well completion, and diagrams of well construction and lithology (attached). Lithologies, taken from well drillers' reports on record at the Idaho Department of Water Resources and the Boise office of the U. S. Geological Survey, are plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers' reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area Fig. 1) is included showing the route of the transect (A-A'), individual well owners, and surface geology (taken from: Othberg and Stanford (1992), Malde (1989), and Mitchell and Bennett (1979)).

Methods

The cross section included in this report is a graphical presentation of subsurface geology based on water well drillers reports, geophysical data of several of the wells (Squires and others, 1992), and additional available geophysical data (Liberty, 1996). Wells along the transect were selected to ensure maximum section coverage although coverage was complicated by a lack of wells in the area just north of the Snake River. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (see attached sheets). Correlations were made at this scale and all data digitized and reduced to produce the cross section in figures 2a and b. Accuracy of all elevations is probably ± 10 feet. The elevations reported here for the top of the basement Miocene basalt are taken from a structural contour map of this contact (Wood, 1997). Locations of several of the faults that offset Late Cenozoic sediments were interpreted from the contour map of Wood (1997) and from a seismic reflection image of the Boise area (Liberty, 1996).

Structure

The structural nature of this area of the western Snake River Plain is inferred to be a normal fault-bounded graben. The principle south-facing fault zone of the northern margin the western plain is to the north of this section but antithetic and synthetic faults within the area bound smaller intrabasinal grabens. Major extensional faults within the western Snake River Plain are thought to be older structures owing to their lack of surface expression and the absence of significant offset in Pleistocene gravels. Major offset of sedimentary rocks and underlying volcanics beneath Boise is evident on the seismic section of Liberty (1996) with offset on one such fault, the Eagle-West Boise fault, of approximately 650 ft. Numerous faults showing small offsets of Tenmile gravels are exposed in quarries south of the city (Squires and others, 1992). However, the small amount of offset on these faults cannot be easily identified in the subsurface at the scale of the accompanying cross section. Faults shown on the cross section just north of the Quaternary Snake River Group basalts are interpreted from the offset geologic and hydrogeologic boundaries within the sedimentary section. These offsets correlate with faults identified in the basement basalts (Wood, 1997).

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits and Quaternary basalts that overlie a basement of basalt. The basement varies in elevation along the profile north of the Quaternary Snake River Group basalts from +1700-ft to -3000-ft (Minus signs indicate elevation below sea level)(Wood, 1997). Surficial deposits include modern flood plain deposits, terrace gravels of Pleistocene age, gravels and finer sediments of early Pleistocene to late Pliocene age, an extensive field of Quaternary age basalts that lie south of the Boise River Valley, and older Tertiary age sediments. Remnants of terrace surfaces are underlain by gravel deposits along the Boise River and include from youngest to oldest: Gravel of Boise Terrace, Gravel of Whitney Terrace, Gravel of the Sunrise Terrace, and the Gravel of Gowen Terrace. All these terrace gravels are identified at elevations below the Gravels of Tenmile Creek. In the area of the transect, a intracanyon basalt flow mantles the Fivemile surface. Othberg and others (1995) report a whole-rock K-Ar age of 0.974±0.130 million years for the Fivemile basalt. A widespread surfical deposit of Pleistocene gravel, sand, silt, and clay overlies much of the Quaternary age basalt in the southern portion of the area.

Beneath the surficial sediments in the Boise Valley is a complex sequence of interfingering lenses of gravels, sands, and clays which are interpreted to represent fluvial and shallow lacustrine deposits. The complex geology of this important aquifer is poorly understood in any detail. Previous work by Squires (1992) has provided evidence of broad depositional systems with characteristic signatures including, a buried alluvial fan system in southeast Boise that grades westward into the river and lake sediments.

Squires (1992) pointed out the importance of color change in sediments, the Boise fan aquifer sediments being characteristically brown, and blue colors being reported for sediments more basinward. This section of this study contains an upper portion in which sediments are commonly some shade of brown, tan, or yellow and a deeper portion having sediments that are described as blue or grey in drillers logs. The boundary between these color-defined units occurs at 2320-ft ± 80 ft elevation and appears in most well logs. The brown-colored unit is up to 800

feet thick beneath the uplands south of the Boise Valley with perhaps as much as 500 feet removed by erosion of the Boise River Valley. The nature of this type of boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. Alternatively, it is also possible that recharge by oxygenated waters percolating through reduced (blue) iron minerals may oxidize formerly blue-gray colored deposits. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. Therefore, caution should be used in using color change in the interpretation of depositional environments.

The southern portion of the transect is underlain by Quaternary basalt deposits that are intermittently covered by a mantle of sedimentary deposits (Caldwell-Nampa sediments of Mitchell and Bennett, 1997). The thickness of these basalts is not well known but maximum thickness encountered along this transect is approximately 600 feet (Swan Falls Farm). The base of these basalts show depth variations with two distinct low points. The more southern low point (elevation 2440-ft in the Swan Falls Farm well) may represent the location of the fourth stage of the ancestral Snake River canyon suggested by Malde (1991). The more northern of the low points, at an elevation of about 2280-ft. in the DeShazo well, lies within a NW-SE alignment of similarly thick accumulations of Quaternary basalts and may represent the eruption of these basalts into an eroded stream channel or into a fault-bounded topographic depression (Wood, personal communication).

Hydrogeology

The static water level in wells along this transect vary little within the lacustrine and fluvial sediments of the northern portion of the profile (north of the Collins well) but southward, the water table slopes toward the Snake River at about 0.1°. Wells completed through the basalts in the south of Boise Valley generally are good producers with large discharge volumes and little drawdown. These wells appear to be drawing water from porous intervals within the basalt such as cinder units as well as from the sediments beneath the basalts.

Wells completed into the fluvial and lacustrine sediments within the Boise Valley can be grouped geographically. The wells south of the Taggart St. well (Nicholson, Tenmile, and MAC) are all completed to a depth of about 2200-ft elevation. These wells are targeting an aquifer in thick sand units from elevations below about 2450-ft. The Taggart St. and Cassia St. wells to the north on the other hand, are completed to depths below 1800-ft elevation and are probably getting the majority of their water from a series of thin sand units below 2200-ft elevation.

References

Idaho Department of Transportation, 1994, 30 X 60 minute series topographic map of Boise, Idaho, scale 1:100,000.

Idaho Department of Water Resources, 1997 microfiche file of drillers reports, Orchard Street Office.

Liberty, L.M., 1996, Seismic reflection imaging of the Boise Geothermal Aquifer; Center for Geophysical Investigation of the Shallow Subsurface, Boise State University, Technical report BSU CCGISS 96-05, p. 18.

Othberg, K.L., and Sanford, L.R., 1992, Geologic map of the Boise Valley and adjoining area, western Snake River Plain, Idaho: Idaho Geological Survey, Geologic Map Series, scale 1:100,000.

Malde, H.E., 1989, Geologic map of the Bureau Formation in the Sinker Butte and Wild Horse Butte Quadrangles, Southwestern Idaho, U.S. Geological Survey Miscellaneous Field Studies Map MF-2063-B, scale 1:24,000.

Mitchell V.E., and Bennett, E.H., 1979, Geologic map of the Boise Quadrangle, Idaho, Idaho Bureau of Mines and Geology, Geologic Map Series, scale 1:250,000.

Squires, E., Wood, S.H., and Osiensky, J.L., 1992, Hydrogeologic framework of the Boise aquifer system, Ada County, Idaho; Idaho Water Resources Research Institute Research Technical Completion Report-14-08-0001-G1559-06.

Wood, S.H., 1997, Structural contour map of the top of Miocene basalt basement rocks, western Snake River Plain, Idaho: Report for Idaho Department of Water Resources (2 sheets, 1:100,000).

Figures and enclosures

Figures 1a and 1b Map (1:100,000) showing cross section transect and wells used in cross section.

Figures 2a and 2b Cross section of geology and hydrogeology across the western Snake River Plain to the Snake River from the Boise, Idaho area.

Figure 2c Legend for cross section

Attached Twelve panels of wells used in cross section showing lithology and well construction.

Attached Drillers reports of selected wells.